

scientifically conducted of American executive bureaus—the one which of all others has done credit to the country, and is appreciated and respected throughout the civilized world. The only way to reach the members of Congress who are capable of carrying out this plan of disorganization, is to make them feel that their popularity will be diminished by their action. Arguments on the merits of the case would have no effect on them.

As regards the New York State Survey, the mischief is done for this year. We have already expressed our opinion of the proposition to place a scientific work requiring skill and experience in the hands of an official elected by popular vote, not for his scientific attainments, but solely for his political affiliations. The Governor would not, we presume, select a ship-carpenter to make an office-desk, nor would he choose a blacksmith to make a clock, but he has suffered himself to be misled into an act equally foolish, through his want of knowledge of the fact that, under the general term, civil engineering is now embraced in a great variety of special branches, the attainment of a high degree of skill in any one of which is as much as any one man can master, and that it does not follow that because a political convention has approved of the record of a proficient in one branch, he is therefore qualified to conduct the operations of another entirely different branch.

#### WATER AND STATE RIGHTS.

THE decision of the United States Circuit Court in the Enfield Dam case is of importance to riparian owners on streams which traverse different States. The Connecticut River Company was authorized by the State of Connecticut to raise the level of its dam at Enfield. This raising would set back the water of the pond into the State of Massachusetts and diminish for several months in the year the head of water at the dam of the Holyoke Water-Power Company, which applied to the United States Court for an injunction restraining the Connecticut corporation from thus damaging its business. The injunction was ordered to issue, on the ground that while the State of Connecticut had undoubtedly right to grant the right to a corporation to injure land in the State, it had no power to authorize the taking of or injury to real estate outside of its jurisdiction in another State. By virtue of the power of eminent domain, it can convert to public use any land within the limits of the State, but not any land outside of those limits. This ruling of the court may have a bearing on the proposed Ramapo scheme for supplying water to New York, for while the case is different and is decided on grounds which could not apply to the Ramapo, the principle of non-interference with exterior rights is plainly laid down in Judge Shipman's opinion. He says: "Jurisdiction comprises the power and the right to inflict consequential injury, but when no jurisdiction exists the right ceases to exist. It is a recognized principle that the statutes of one State in regard to real estate cannot act extra-territorially."

THE cholera has made its appearance in Toulon, and the French authorities are preparing for an epidemic. There seems no reason to doubt that it is Asiatic cholera, and that it was introduced through a transport ship. There is every reason to fear its spread, for all attempts to limit it by inland quarantine or measures of isolation have heretofore been useless, and it is probable that it is merely a question of time as to when it will reach our own shores—*i. e.*, whether we shall have it this year or next.

When it does come it will probably not flourish in our large cities so well as in the smaller towns, where the water-supply is from wells, and sewage is disposed of in leaky vaults and cesspools. All such places have now had ample warning, but we fear few will profit by it.

As the Sundry Civil Appropriation Bill passed the House, it contains the following clauses:

"That all laws or parts of laws authorizing the appointment of a National Board of Health be, and the same are hereby repealed."

"United States quarantine buildings, Marine Hospital Service, Gulf quarantine: for building wharf, ten thousand dollars."

The Senate has since struck out the clause abolishing the Board, and the House will, it is believed, accept this change in the bill.

#### OUR BRITISH CORRESPONDENCE.

*Meteorology of the Past Year—Conferences at the Health Exhibition—Cow's Milk as a Vehicle of Infection.*

LONDON, June 14, 1884.

THE following particulars relating to the meteorology of the past year are taken from the annual report, just issued, of the Astronomer Royal at the Greenwich Observatory to the Board of Visitors. The mean temperature of the year 1883 was 49.3°, being 0.4 lower than the average. The highest air temperature was 85.1°, on August 21, and the lowest, 20.6°, on March 24. The mean monthly temperature was above the average in January and February, and below in March and July. In other months it differed little from the average. The mean daily motion of the air in 1883 was 291 miles, being 12 miles greater than the average. The greatest daily motion was 842 miles on December 12, and the least 62 miles on December 26. The number of hours of bright sunshine during 1883 was 1,241, which is about 30 hours above the average of the six preceding years. The aggregate number of hours during which the sun was above the horizon was 4,454, so that the mean proportion of sunshine for the year was 0.289, constant sunshine being represented at 1. The rainfall in 1883 was 21.9 inches, being about 3 inches below the average. It is recorded that no marked connection between magnetic or electrical disturbances and the phenomena of the remarkable sunsets of the past year was noticed.

During the past week conferences have been held daily at the Health Exhibition, when papers more or less connected with sanitary matters have been read and discussed. In a paper read yesterday by Dr. Thursfield, on "Milk as a Source of Disease," some interesting facts were adduced. The author dealt chiefly with the subject of cow's milk as a vehicle of infectious and epidemic diseases to the community, coupled with suggestions for the more effectual prevention of outbreaks of such diseases. He stated that the use of milk by adults had enormously increased, partly owing to the fact that the proportion of women physically incompetent to suckle their offspring was annually increasing. He said that, making allowances for all doubtful cases, it might be accepted as an absolute fact that epidemics of typhoid and scarlet fevers had been repeatedly disseminated by milk, and that there was very strong evidence that diphtheria had been so disseminated. In the case of the majority of milk epidemics, typhoid fever had been the disease involved, and he added that if there was one fact which more than any other had been uniformly brought out in milk epidemics, it was that the consumers of boiled milk had, as a rule, escaped, and the same fact had been noticed in outbreaks of an American epizootic. The author suggested that the urban sanitary authority should have the power to stop the sale of milk consigned from any particular farm pending investigations, and that the retailer of milk should be called upon to furnish a list of his customers. In the discussion which followed the reading of the paper, Professor de Chaumont said that the view accepted in England, that milk was the means of communicating enteric and scarlet fevers, was by no means accepted abroad, where, in fact, it was ridiculed. He believed a frequent way in which typhoid fever was conveyed by milk was the adulteration of it by impure water, and scarlet fever might be disseminated by the poisonous "scales" from a person engaged in the process of milking. Several other speakers took part in the discussion, but they all agreed that milk under certain circumstances was a source of disease.

#### SAFETY-VALVE.

RENWICK M. MACLEOD, Chief Sanitary Inspector of Glasgow, Scotland, is in this city studying the system of house-drainage.

#### PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

##### No. I.

###### WATER-SUPPLY AND DRAINAGE.

We begin in this article a description of the plumbing, with its appurtenances, and such other matters as we think will be of interest to our readers, of the new house now being built for Mr. Henry G. Marquand, at the northwest corner of Madison Avenue and Sixty-eighth Street, in this city, from plans by Mr. Richard M. Hunt, architect, and under the superintendence of Mr. Maurice Fornachon. The master plumber is Mr. Alexander Orr, of 19 East Eleventh Street, in this city.

Our illustration, Fig. 1, is the ground plan of the building, and all outside the wall, X, Y, Z, is either under the sidewalk or forms light areas.

The principal source of water-supply is from the Croton main at the Sixty-eighth Street side of the building, at *m* and *n*; the pipe *m* being for the direct service, and the pipe *n* being for the sole purpose of supplying the Ericsson hot-air engine at *g*, which forces the water to the tank in the top of the house for a high or *indirect* service. These pipes are both drawn-brass, tinned, and two inches in diameter.

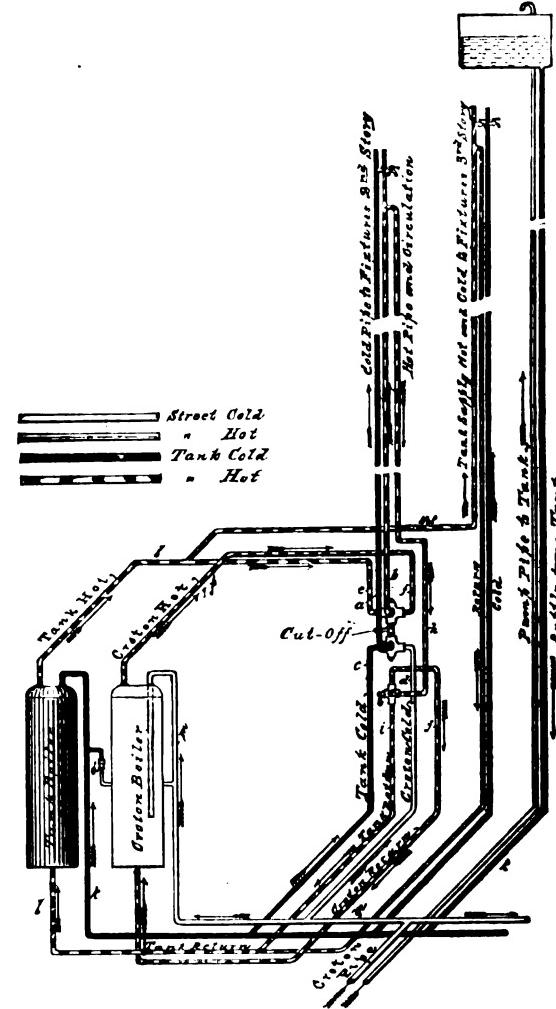


FIG. 1.—WATER DISTRIBUTION.

On account of the house having but a single regulation tap, —— inches internal diameter, it was necessary to carry these pipes to a point as near the main as possible, before uniting them, to prevent the action of the pump when in operation from making a pulsation or intermittent flow of the *direct* house-service.

To accomplish this, a drum or header *b*, shown broken in the diagram, Fig. 2, is used. It is four inches in diameter and about five feet in length, and is united to the main by the service-cock *c*. This method lessens friction, and allows the disturbed water currents to assume direction, giving a result almost equal to separate taps, and making it practicable to use large pumps for tank-supply where only one tap can be obtained.

At the Madison Avenue side of the house, at *o*, is a separate service-pipe, two inches in diameter, carried to the street, and connected into the general supply of the house. This pipe is not connected with the main on Madison Avenue, but is put there with the hope of obtaining permission to tap this pipe, so as to insure a supply to the lower part of the house, should the Sixty-eighth Street main be shut off, as must frequently occur.

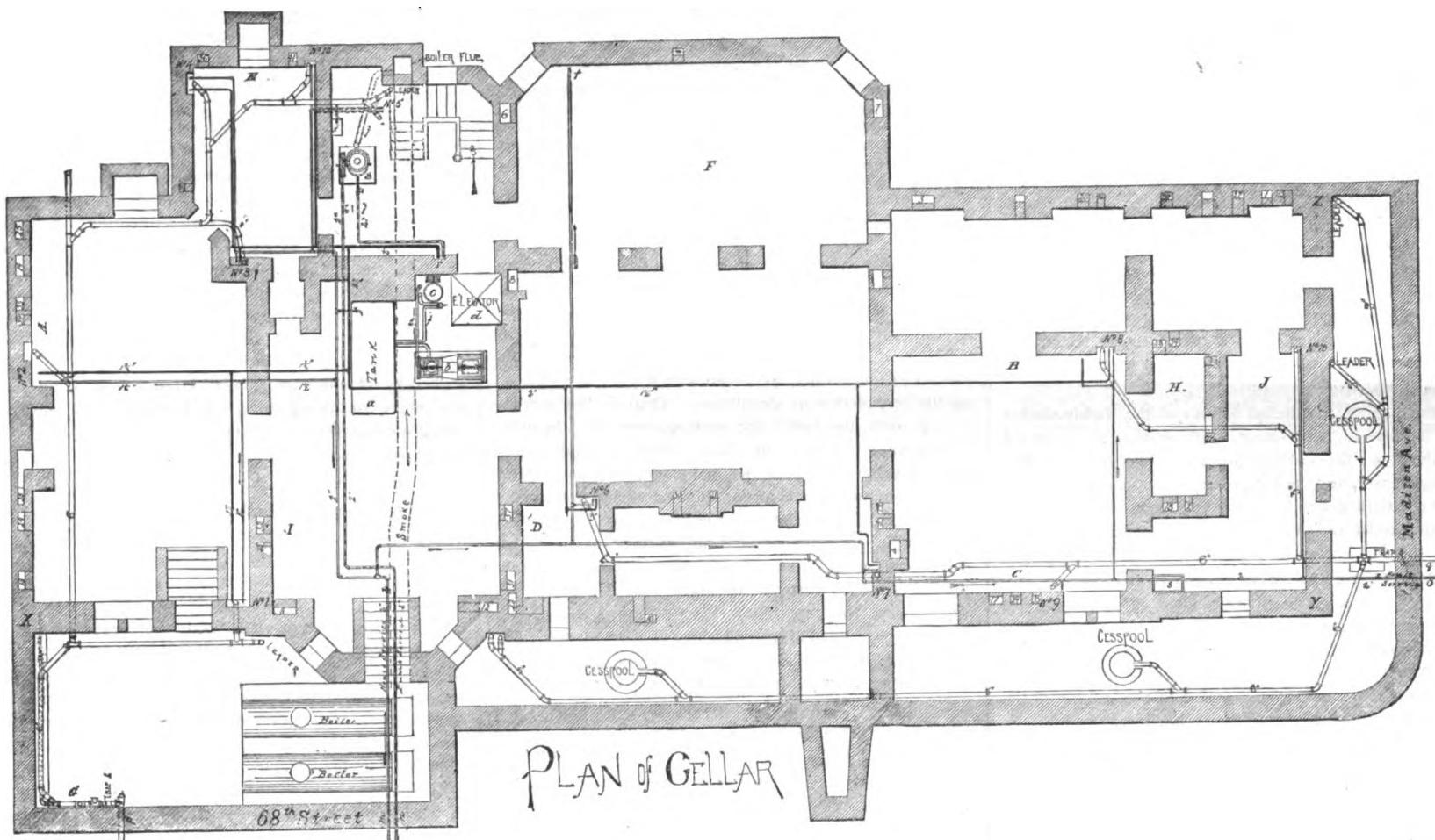


FIGURE 1.

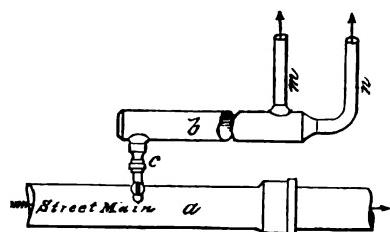


FIGURE 2.

The course of the direct supply—called in New York “Croton supply”—is from *m*, in the direction of the arrows, through the pipes, indicated by two lines. The course of the indirect supply—called “tank” or high pressure—is through the pipes *n*, *h*, to the pump, thence through the pipe *i* to the tank at the top of the house, through the recess *r*, down which recess the tank-supply pipe is again taken to the cellar for distribution through the pipes indicated by the solid black line, which, it will be noticed, run to similar points in the cellar, as do the direct supply-pipes, numbering, consecutively, from *I* to *8*, inclusive. The capital letters on the plan, with the exception of *X*, *Y*, and *Z*, indicate positions in the building over which are situated apparatus or fixtures to be described and illustrated in following numbers. Over *A* is the kitchen, with its high and low-pressure boilers and hot-water supply; over *B* is the laundry-boiler and range; over *C*, laundry-tubs; over *D*, the servants' bath-room; over *E*, butler's pantry; over *F*, the fountain; at *G*, a detail of house-drain; over *H*, the clothes-drying room; over *I*, the ice-house; over *J*, the conservatory, and over the rising lines marked by *numbers*, plumbing fixtures, bath-rooms, etc.

Before giving a description of the hot and cold water supply in detail, we will describe briefly other features shown in the cellar plan.

The house-drainage is divided; part goes to the sewer at Sixty-eighth Street and part to Madison Avenue, as shown. The system used is that approved by the New York Health Department, and is, in the fewest words, commencing at the street: The house-sewer; a house-trap at area wall; a foot-vent, taken from near the curbstone; the necessary horizontal ramifications of the house-drain of the sizes marked and leading to the risers and the leaders, rising lines extending above the roof; separate traps for every fixture; separate vent for every trap; back-air lines from trap-vents, extending above the roof; trapped rain-water leaders where they enter the house system; separate drains

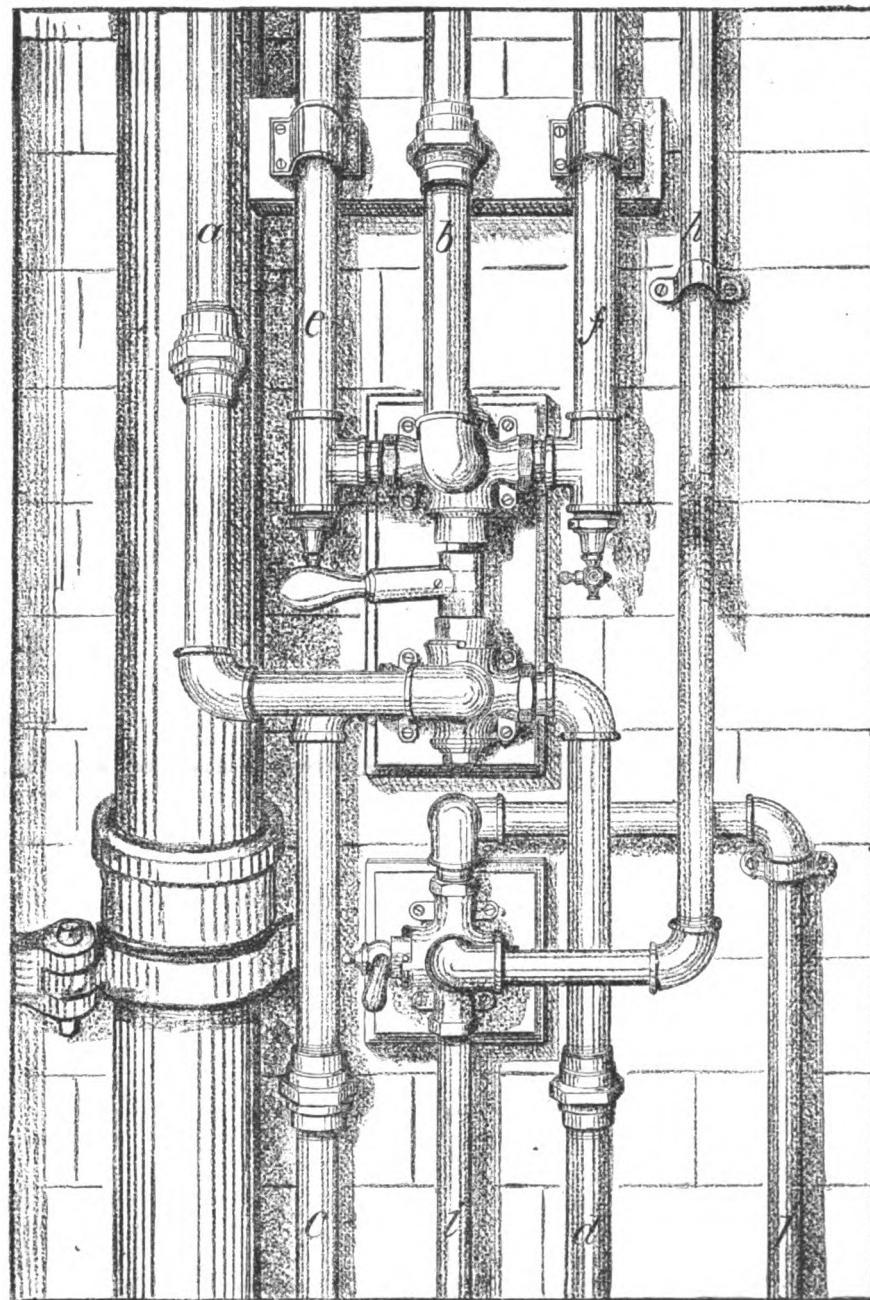


FIGURE 4.—DETAIL OF CUT-OFF.

for the majority of the rain-leaders and the area cesspools; entering an "ever-sealed" trap at 3, Madison Avenue side.

At the position marked "elevator" is one of the Whittier passenger-elevators, worked by hydraulic pressure; *d* is the elevator car; *e*, the vertical cylinder, twenty-four inches in diameter; *c* and *f*, the water-circulating pipes, and *a*, the lower tank, 4 feet wide by 12 feet long by 6 feet deep, from which the Dean steam-pump *b*, with eight steam cylinders and 5-inch water-cylinders by 14-inch stroke, forces the water again to the elevator-tank in the top of the house.

The diagram, Fig. 3, is the scheme of the combined methods of water distribution—*i. e.*, low and high-pressure and cold and hot-water systems—and it is introduced to make clear to the reader the general system, previous to illustrating in detail any of its parts, that he may be able to group them and form a just conception of their relation as they appear.

In the diagram the shaded boiler and the darkly-shaded pipes indicate high pressures, or those that are supplied from the tank; the cold high-pressure pipes being unbroken lines, such as *k*, and the high-pressure hot-pipes and their return circulations being broken lines, such as *l*, while the unshaded boiler and pipes indicate low pressures or Croton pipes, the hot being distinguished from the cold by a broken or dotted line through their centres.

All the cold-water distributing-pipes, either from street or tank, are brought to the cellar ceiling, from which they are hung; thence run to their respective rising lines. All the warm-water distributing-pipes, whether from the tank boiler or Croton boiler, are carried to the ceiling of the basement, and thence run to the rising lines.

All water taken to the third story is from the tank-pipes, and no provision is made for any other supply or "change-off," as the Croton pressure can rarely be expected to reach there.

All water taken to the second story is from either of the two systems, with the means at every line of changing from the street system to the tank, or *vice-versa*, the particulars of which will be given below.

All the water taken for the first floor, basement, and cellar is from the street pressures.

The diagram now shows the second floor supplied with hot and cold water from the tank, according to the shading of the pipes; for instance, the cold water from the tank passes through the pipe *K* and its branch *C*, in the direction of the arrows, to the "cut-off," where it enters the pipe *a*, which runs to the fixtures. In a similar manner the tank water from the pipe *K* enters the boiler, where it is warmed, and passes through the pipes *l* and *e* to the "cut-off," thence through *b* to the fixtures, returning through the circulation-pipe *h*, to the lower three-way cock of the "cut-off," thence through the pipe *i* to the general return-pipe *l* to the boiler. Reverse the handles of the cut-off valves, and the Croton water will then pass from the pipe *m* to the pipe *d*, thence through the pipe *a* to the fixtures, while the course of the hot water will be from the Croton boiler through the pipe *f* to the cock, and through *b* to the fixture, returning by the pipes *h* and *j* to the boiler.

At *a'*, between the boilers, is a check-valve in the pipe connecting the pipes *M* and *K*. This is to allow the street pressure to pass into the tank-boiler, and keep it supplied, should the tank become empty.

Figure 4 is a detail of the "cut-off" used in riser No. 1, the letters corresponding to those used in similar parts in Fig. 3.

(TO BE CONTINUED.)

#### FLUCTUATIONS OF GROUND WATER AND RESULTANT DISEASE.

MR. BALDWIN LATHAM, M. Inst. C. E., writes to the London *Times* that the indications are that there will be in England during the coming autumn a general low state of the ground water, and that this has occurred with regularity every tenth year since 1854. He adds:

"Whenever the water in the ground has reached a considerable degree of lowness, when replenishment commences, in all places in which the water is liable to pollution, we have the conditions which bring about epidemics of typhoid fever, and it therefore behoves all persons who are suspicious of the quality of their water-supply to take the precaution to have all water used for dietetic purposes boiled before it is used during such periods as we are now entering upon. By adopting this precaution much illness and suffering may be prevented."

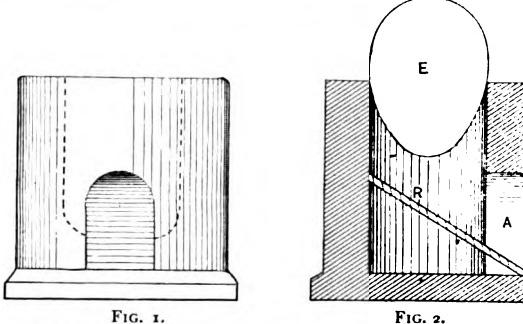
#### THE INTERNATIONAL HEALTH EXHIBITION. No. VI.

(Continued from page 73.)

*It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.*

#### GENERAL APPEARANCE OF THE EXHIBITION—MODEL DAIRIES.

*South Gallery.*—The four model dairies referred to in the previous article are situated about half-way down the South Gallery on the left-hand side as you enter from the Exhibition Road. The first of these four (No. 245) is fitted up by Bradford & Co., of High Holborn, London, and consists of four rooms, each lined with white tiles and looking the very picture of cleanliness. There is the milk-receiving room, the boiler, the working-room, and the milk-settling room. There is no drain within the building, but the floor being built on an inclined plane, with an earthenware channel running along it, all the drainage is conveyed outside the building into a grid placed for the purpose. The building is well ventilated and warmed, and is stated to be complete with all the most modern apparatus for making and preparing butter. Adjoining this exhibit is Welford's dairy (No. 247), of St. Peter's Park, London, W., which is constructed after the fashion of a farm-house. The interior is fitted with a shed containing six Alderney cows in stalls, and four goats in a paddock. There is a can-cleaning room, butter-making department, and a laboratory fitted up with appliances for the analysis of milk. The interior of the building is lined with white tiles and windows



filled with stained glass. The whole structure is furnished throughout with the latest sanitary arrangements, as approved by the Sanitary Assurance Association. Next to Welford's comes (No. 243) the dairy of the London and Provincial Dairy Company, 4 Halkin Street, London, W., which is not quite so tastefully got up as Welford's, but covers more ground. Here is a complete collection of everything in the way of live-stock, poultry, etc., appertaining to a first-class dairy-farm. The various methods of making butter and cheese and of extracting cream are fully demonstrated, as well as the systems for preserving dairy produce in refrigerators and dry-air machines. The Express Dairy Company's (Bloomsbury Mansions, W. C.) exhibit (No. 244) comes next. This dairy is very large and substantially built and seemingly contains all that a modern dairy-farm should. There are four cows kept in the building, besides several goats, and cheese and butter making in their various stages are fully demonstrated. All the appliances connected with the ventilation and sanitary arrangements generally of dairies are also shown.

There is an interesting exhibit (No. 200) in the South Gallery, by Otto Hilmer, of 64 Friedrich-Strasse, Berlin, consisting of an egg-tester. It is a small machine, made of tin, and hollow, about four inches high, in shape like a pepper-box, having a cavity at the top and an opening at one of the sides, and fitted internally with a reflector placed at an angle of 45°. The egg to be tested is placed in the cavity of the top, which serves as a kind of egg-cup, and its image is reflected on the glass within. By looking through the side opening at the glass, if the image of the egg looks transparent the egg is good; if opaque, it is bad. Perhaps the subjoined rough sketch may serve to make the description plainer. Fig. 1 represents the general appearance of the machine, while Fig. 2 shows in section the mode of placing the glass.

#### EAST ANNEX.—PLUMBING AND WATER-FITTINGS.

The East Annex and East Gallery, which are reached by the first turning on the right out of the South Gallery as you enter from the Exhibition Road, contain exhibits of special

interest to the sanitary engineer, but as all the important exhibits will hereafter be described in detail in these columns, the present article will be confined to a general account of the contents of these sections.

In the East Annex are exhibited specimens of water-closets, earth-closets, commodes, urinals, and water-fittings. The East Gallery is given up to exhibits of house decorations, etc., such as non-arsenical wall-papers and washable wall-papers. There are also exhibited in this section various specimens of flooring-tiles and parquet flooring. The East Arcade is given up to grates, stoves, ranges, of every description, size, and manufacture, some of very pretty design and all possessing, according to their respective makers, features of peculiar interest. The Nautilus grate, exhibited by Mr. T. Petter, of Yeovil, Somerset, is of rather novel design. In form it resembles a nautilus shell and is described by its maker as a fire-brick lined, slow combustion, and smoke-consuming stove. It burns ordinary soft coal. The grate may be readily removed, being on wheels. The smoke passes out of side pipes into the chimney.

#### EAST QUADRANT.—HYGIENIC DRESS.

Passing through the last arcade and the refreshment-room at the end of it, we come to the East Quadrant, in which specimens of modern dress are exhibited, and so-called hygienic boots and shoes, constructed, as alleged, on anatomical principles. Here we have specimens of the "Perfect" boot, the "Sensible" boot, and the "Natural" boot, etc. Continuing our journey through the East Quadrant we arrive at the stalls at the back of the Albert Hall devoted to lace-making, and in the West Quadrant we find exhibits of specimens of ancient dress, wax figures dressed up, in glass cases, each case containing four, and illustrating the various fashions from William the Conqueror's time to the present century. Mr. Wingfield has personally superintended the execution of these exhibits, and in every case they are said to be copied from authentic pictures of the period. Some of the costumes are very remarkable, particularly those of the time of George III., when huge head-dresses were worn by men as well as by women, and of George II., when fashionable ladies wore enormous hoops made of cane-work, the diameter of some of the skirts at the hips appearing to be about four feet.

(TO BE CONTINUED.)

#### ARRANGING CHEAP IMPROVED DWELLINGS.

In discussing the character of the accommodations which should be provided in dwellings at low rents for the laboring classes, Mr. T. Chatfield Clarke said recently, before the Surveyors' Institute in London, that through ventilation from front to back should be obtained if possible, and it should be a cardinal point to arrange the rooms not side by side, but as front and back.

The staircases to the blocks or dwellings should be open to the air, and each set of rooms should have its private door as if the staircase was the street; open galleries should be avoided as destructive of privacy.

In every case where it is possible the arrangement of the closets should be on open galleries, or, at least, entered through a scullery or wash-house, with direct access to the outer air.

The plan of lavatories and water-closets off the staircases is not one that should be extensively followed.

A simple and inexpensive system of fire-proof flooring should divide the floors throughout.

When at all possible, some play-yard or drying-ground should be attached to the buildings, and, if possible, wash-houses for laundry purposes.

In planning the buildings, an effort should be made to enable some rooms to be let off as single rooms, with a power, however, of adding two or three together if needed.

Preserve, as far as possible, a cheerful and cottage style of dwelling, as opposed to dull and heavy blocks.

Care should be taken that all the sanitary and other appliances should be of the simplest, yet, at the same time, of the strongest character.

As a sanitary aid in the construction of such dwellings, the walls and the ceilings be of the hardest material possible, and able to be often cleansed.

#### PERSONAL.

CITY ARCHITECT VINAL, with the President of the Directors of Public Institutions, and Committee on New Buildings and Repairs, of Boston, is making a tour of inspection in the principal Eastern cities, preparatory to the construction of the new hospital on Deer Island, for which Boston City Council has appropriated \$60,000.

According to the *North German Gazette* a deadly disease, described as a sort of bubo plague, is epidemic around Bagdad, on the right bank of the river Tigris. The prevalence of the disease was concealed for a long time by the Turkish officials, but they have at last enjoined quarantine rules. The disease is said to be very rapid, proving fatal in three or four days.

## SAFETY-VALVE.

## PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

## No. II.

(Continued from page 98.)

ALL the drain and soil, as well as the "back-air" or vent-pipes, with their fittings, are of *extra heavy cast iron*, and were carefully selected and inspected before being dipped in tar. They were all tested when in place by filling the lines with cold water, the nearly horizontal pipes in the cellar receiving a pressure per square inch equal to about twenty pounds, which pressure, of course, decreases in a ratio of one pound per square inch to about every 27 inches of height in the rising lines, but insures a greater pressure at the highest fixture than it is possible to obtain with use.

On the cellar plan, in our last issue, the house-drain is shown approximately in true position, which is always near the walls. No pipe is underground or hidden, but all are carried on ledges on the walls, as shown on Fig. 5, or on brick piers with stone caps and iron cradles, as in Fig. 6.

Figure 5 is a detail of the main house-drain, etc., as seen in the boiler-room, at C, on the cellar plan. It is here the connection with the Sixty-eighth Street sewer is made, all parts of the pipe being above ground to the front wall of the boiler-room, which wall extends to the line of the curbstone at this point; *a*, in Fig. 5, is the 6-inch "house-sewer," which is furnished with a screw-plug *b* to give it a straight opening into the main sewer; *c* is the house-trap, also 6 inches, with its hand-hole; *d* is the foot-vent from the sidewalk near the curbstone, and *e* is the "house-drain." The pipe *f*, with its trap *h*, is at the point where the underground drainage from the foundation-walls enters the house-drain. The boiler-room is about four feet deeper than the cellar of the building, and is sufficiently below the subsoil drainage to permit the arrangement which is shown. At *g* is a door in the ledge leading to the trap and pipe in the wall to allow the engineer to inspect it, and keep it full of water should it be likely to evaporate. The boiler-room being below the sewer level, the hand-pump *i* is provided, and connected with a receiving basin under the flagstones, into which the underdrainage from these walls can run and be pumped into the sewer as shown.

Figure 6 is a detail under the butler's pantry, at E, on the cellar plans, and shows part of the main house-drain *F*, with its supports, the soil-pipe *E*, and the vent-pipe *D*. The arrangement, consisting of the box *A*, the trap *B*, and the pipe *G*, is to provide for the proper removal of the drip water from the ice-box in the butler's pantry, and is similar to the arrangement placed under the ice-house at I, the description of which will answer for both. *A* is a pine box, 12 inches long by 7 inches deep inside, and made of 1½-inch boards. It is lined with 6-pound lead, and provided with a stand-pipe *a*, which is fitted into the ground-ferrule *b*, which, together with the waste-pipe connecting with the trap *B*, are wiped into the bottom of the box as shown. The pipe *G* is the drip-pipe from the ice-box or ice-house, as the case may be, and is carried about two inches beneath the surface of the water in the box. This traps the pipe *G*, preventing a current of air from the cellar passing into the ice-box, and also separates the pipe from direct communication with the trap *B* or house-drain. To cleanse the box *A*, the stand-pipe *a* can be removed, allowing settling, etc., to be washed from the lead into the sewer. A water-pipe not shown also terminates over the box *A*, to allow of flushing. The pipe *C*, from the top of the trap *B*, serves the double purpose of air-vent for the trap and to allow the condensation from the line of vent-pipe *D* to run to the house-drain through the trap. In other respects the diagram speaks for itself.

(TO BE CONTINUED.)

## PERSONAL.

DURING the months of June and July information with reference to the Massachusetts Institute of Technology can be obtained by addressing Prof. W. R. Nichols, care of THE SANITARY ENGINEER, 92 and 93 Fleet Street, London, E. C.

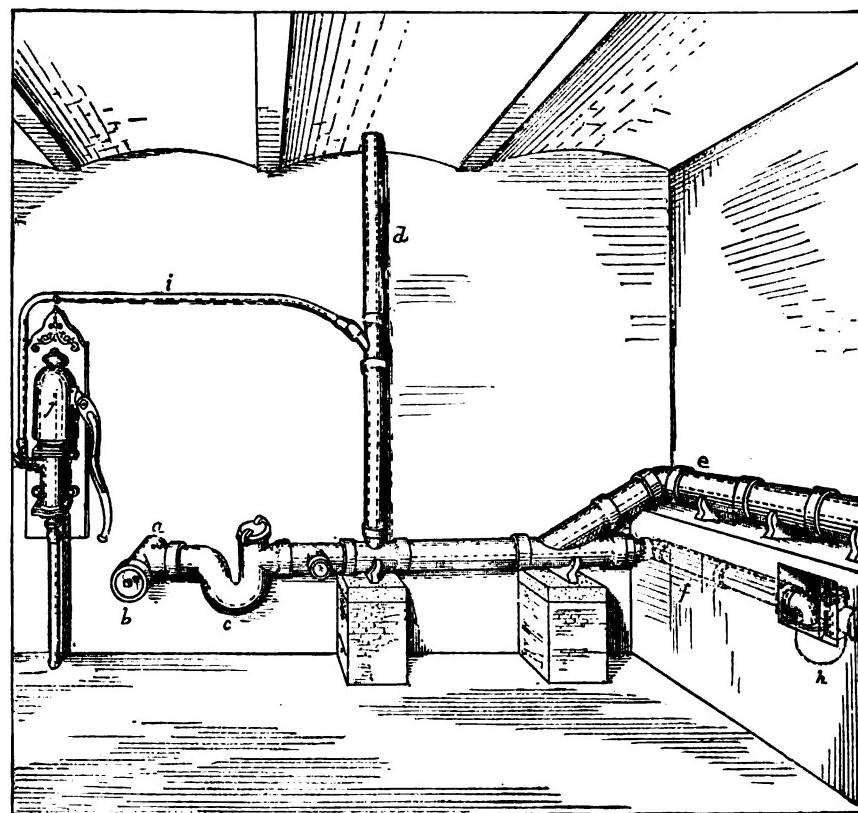


FIGURE 5.—DETAIL OF HOUSE-DRAIN.

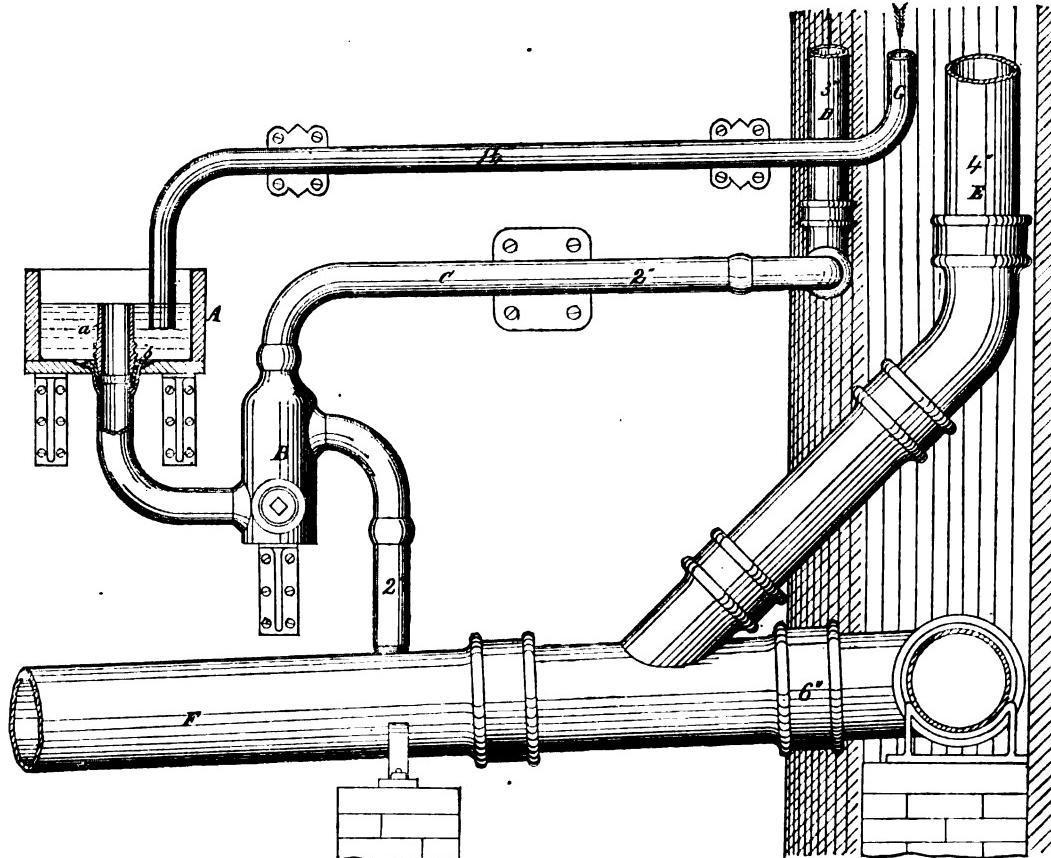


FIGURE 6.—MODE OF TRAPPING REFRIGERATOR-WASTE.

## A MEDICAL VIEW OF THE PLUMBER.

AN opinion on the position of the plumber in modern sanitary progress from the medical standpoint is given by the *Hahnemannian Monthly* in the following words:

"Once the name of plumber was never mentioned without a sneer or a joke. Once the plumber was the householder's worst enemy. 'Scamped' work was the rule, and not the exception; joints were made in the clumsiest fashion, leaks were puttied, and the use of traps was practically discarded. Now, in every large city there is a master plumbers' association; there are discussions about the best methods of scientific plumbing; men who do disreputable work are frowned upon by their brethren of the craft, and the conscientious, educated plumber is one of the householder's best friends—working with the family physician in preventing as well as fighting disease. In New York and Philadelphia, possibly in other cities also, we now have schools for plumbing, where the trade is taught as it should be. The cities have adopted plumbing regulations which have done incalculable good, though yet far from perfect."

There are frequent arrests in New York for the violation of these laws, and plumbers and builders are now forced to obey the laws of health. It is not our present purpose to criticise these regulations, the defects of which will doubtless disappear in time, but to point to the fact that their very existence is one of the undeniable proofs of the advance of sanitary science."

THE Department of Inland Revenue of Canada has decided that tea-dust as an article of food is injurious to the public health, and cannot be admitted into Canada.

INSPECTOR MCLEAN, of the Brooklyn Board of Health, found twenty-five cases of pleuro-pneumonia in nine cow-stables in Brooklyn.

GOVERNOR CLEVELAND has received numerous complaints from the New York Sanitary Reform Association relative to the Hunter's Point nuisance. He has also ordered a strict quarantine of cattle afflicted with pleuro-pneumonia, and that the law relating to the slaughtering of infected cattle shall be rigidly enforced.

sand, but the action of a common sand-filter upon such matter is very slight, and Professor Pumpelly has shown that as regards living micro-organisms such filtration has practically no effect.

Professor Nichols shows that the action of a sand-filter upon dissolved saline substances amounts to nothing, and that experiments heretofore reported in which it seemed as if a portion of the dissolved salts was removed from the sand gave this result, because the sand was not perfectly dry.

In a sanitary point of view this is a matter of some importance, because this process of sand-filtration is going on on a large scale in the majority of villages in this country, the liquids filtered being derived from privy-vaults and cess-pools, and containing organic matters and saline substances. It also shows that the fact that the level of a well of fresh water near the sea-shore may vary with the tide does not prove that the water in the well comes from the sea, but merely that the tide causes a periodical obstruction to the flow of the ground water, which is the real source of supply.

The great objection to a sand-filter, whether it be in portable form to be attached to a cistern or other source of supply, or in the form of immense sheets or beds, as laid down by nature, is that it gives a false sense of security, and leads people to neglect precautions which are just as important when it is present as when it is absent.

It will be remembered that the Governor failed to approve the amended Food Adulteration Law. As no provision was made for this work in the Supply Bill, the Board of Health has no funds for the enforcement of the original law. In view of this fact, the board, at a meeting held in this city on June 28, adopted the following resolution, which ends the board's rather fruitless efforts at enforcing an adulteration law:

*"Resolved,* That inasmuch as the functions of this board in regard to inspection of oleomargarine have been superseded by recent legislation, and inasmuch as no appropriation has been made for the payment of experts under the general law to prevent adulteration of food and drugs, the corps of experts employed by the board is hereby discharged till otherwise ordered."

A PLEA for the retention of wells in Brooklyn, shown to be impure by the analyses made by the Department of Health, was advanced by temperance advocates last week. Dr. Raymond, Commissioner of Health, pointed out the proper way in which the advocates of temperance could advance their cause by increasing the number of public hydrants from which pure city water could be obtained. He would petition on their behalf that the additional hydrants be erected.

#### PERSONAL.

THE Board of Health of Philadelphia organized for the year on July 6, by electing General Sickle, President, and Mr. Hirsh, Secretary.

DR. J. BERRIEN LINDSLAY has been elected Secretary of the Tennessee State Board of Health in place of Dr. C. C. Fite. Dr. J. D. Plunket is President.

DR. BEACH, Inspector of the New York State Board of Health, has found eleven persons suffering from trichinosis in Arietta, Hamilton County.

NEW YORK STATE BOARD OF PHARMACY.—The following persons are members of the New York State Board of Pharmacy, by appointment of Governor Cleveland: Alfred B. Husted, Edward S. Dawson, Jr., Curtis H. Haskin, J. Hungerford Smith, and Clark Q. Otis.

MR. J. K. BROWN, State Dairy Commissioner, has appointed a number of inspectors to look after the milk-supply of this city, and vigorous efforts are being made to prevent the introduction of an adulterated article. The commissioner will limit his work to an inspection of the milk as it enters the city, leaving the city health department to look after the supply as sold at retail.

#### OUR BRITISH CORRESPONDENCE.

THE SANITARY ENGINEER at the Health Exhibition—*Cholera in France—Sewage-Works at Madras—Action of Germany and Austria to Prevent the Introduction of Cholera—Czar's Contribution to Sufferers from Inundations in Poland—Opening of the Central Institute of Technical Education—A New Disease—Eloquence and Sewer-Gas—Sir Joseph Bazalgette's Inaugural Address.*

LONDON, July 5, 1884.

THE editorial references in the *Pall Mall Gazette* and *Lancet* to THE SANITARY ENGINEER exhibit at the "Healtheries" of tenement-house plans and of printed matter explaining the method of enforcing the plumbing and tenement-house laws of New York seem to have excited considerable interest. The editor of THE SANITARY ENGINEER, yesterday, on invitation, gave evidence before "The Royal Commission on the Housing of the Working-Classes," on the powers of the New York Board of Health, the working of the tenement-house acts, and the past and present state of the problem in the city of New York.

The alarm in France at the outbreak of cholera in Toulon and the respect for scientific attainments seem to have overcome the prejudice of the French against the Germans, as instanced in their employment of Dr. Koch, of Berlin, chief of the recent cholera commission in Egypt, to investigate the cause of the recent outbreak in Toulon.

Within the last three months there have been three reported cases of woolsorter's disease (anthrax) in Bradford. Previous to 1880 there were numerous instances of the disease, "Van mohair" being at that time regarded as the most dangerous to sorters, and most productive of disaster. In 1880 Mr. Speal, the Local Government Board Medical Inspector, visited the town and ordered certain precautions, the carrying out of which was attended by good results for the time. The present outbreak is attributed to other classes of mohair—Cape of Good Hope, Turkish, etc. The coroner of Bradford insists on an inquest and investigation in every case, and it is hoped that the precautions now being taken will soon cause the stamping out of the disease.

The recent fire at Hampton Court Palace has caused the authorities to make more efficient provision for the protection of the palace. The First Commissioner of Works has just given instructions for hot-water apparatus to be placed throughout the state apartments, and has ordered the present stoves to be removed.

The new sewage-works at Madras, India, were opened by the Governor, Mr. Grant Duff, last Monday. In his speech at the ceremony, he said Madras, in his opinion, wanted nothing but sanitation to make it an agreeable place of residence throughout the year, and he was happy to open these works, being, as they were, a step in the right direction to insure an improvement in the sanitary condition of the town.

Vigorous steps are being taken in Germany and Austria for the prevention of the introduction of cholera. The Vienna Small-pox Hospital has been cleared in preparation for possible cholera patients, and in order to facilitate a more thorough inspection, the whole district has been divided into forty-three medical districts.

The Czar has contributed 200,000 roubles to help to alleviate the distress caused by the recent disastrous inundations in Poland. In one district of Posen alone 60,000 acres are under water, and the crops have all been more or less destroyed.

The Central Institute of Technical Education, at South Kensington, was opened by the Prince of Wales, Wednesday, the 25th ult. The architect of the new building is Mr. Waterhouse, and the cost of the structure up to the present has been over £75,000. In this building instruction, by selected and tried professors, will be given in all branches of technical education. The Livery Companies of London have contributed largely to the cost of the undertaking, and have promised material assistance for the support of the staff of professors and assistants, for the maintenance of whom a large sum will be annually required.

According to the *London Medical Record*, a new disease has been discovered. It has been met with in Siberia, where it is known under the name of "Miryachit." The person affected is seized with an irresistible desire to imitate everything he sees or hears. A like disease is known in Java under the name of "Lata."

The following bit of fine writing is a *verbatim* copy from a small pamphlet published in praise of the "Parcae" system of disposal of sewer-gas by cremation, which is on view at the "Healtheries," the vulgar term for the International Health Exhibition, to distinguish it from last year's "Fisheries":

"In later years eminent Scientists have proved that the Zymotic diseases are engendered by the organic action of sewer gas and its exhalation associates; that its virulent properties are generated and propagated in myriads by the exposure of milk, broth, meat, or any moist medium containing animal, fishy, or farinaceous matter to its pestilential influence; any of these (*sic!*), if introduced into the human system, begets every form of Zymotic disease.

"The medley of gas, recognised as sewer gas, is always incorporated with an exceedingly minute vapid fume that has hitherto baffled every attempt at analysis; this vapour is supposed to be protoplastic, and the matrix of all the ills engendered."

If any sanitarian has not read Sir Joseph Bazalgette's inaugural address to the Institution of Civil Engineers, he should at once procure a copy of the seventy-sixth volume of proceedings of that institution, just published, in which the whole of it appears, accompanied by a series of tables of the very greatest interest. Among other valuable information will be found the following particulars appertaining to eighty-one of the principal cities of the world—viz.: population, number of houses, ratable value, length of streets, length of sewers, water-supply, daily and per head, sources of supply, annual rainfalls, quantity of refuse off streets per annum, cost of cleansing streets, dust and refuse removed from houses, police employed, number of vehicles, length of tram-lines, abattoirs, lighting, annual death-rate, etc. Altogether it is a marvel of careful compilation which can be studied with advantage by any one.

#### SAFETY-VALVE.

#### PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

##### No. III.

(Continued from page 121.)

THE illustration, Fig. 7, is a view in the kitchen of the Marquand house.

The boilers A and B are respectively the "Croton" and "tank" boilers shown in the diagram Fig. 3, page 96, issue of July 3, which diagram is illustrative of the system of piping used in the distribution of the hot and cold water.

The letters used here to indicate the parts are the same as those used in the diagram, and a comparison with it will familiarize the reader with the system and assist him to compare the disconnected parts.

The position of the kitchen is over A, cellar plan; the chimney-jambs corresponding to the position of the range shown in the cut, from which the position of the boilers and the sinks can be readily ascertained.

The "Croton" water-pipe, *m*, 1½ inches in diameter, is taken from the general cold system in the cellar through the floor at *m*, passing up and entering the boiler A at *m*, on top. The "tank" water-pipe, *k*, also 1½ inches in diameter, comes through the floor from the tank-main in the cellar, entering the boiler at the top. Between the "Croton" pipe, *m*, to the boiler, A, and the tank-pipe, *k*, to the boiler, B, is a ¾-inch pipe, shown by dotted lines and furnished with a stop-valve and check-valve, *a'*. The object of this pipe is to allow water to pass from the Croton-pipe, *m*, into the tank-pipe, *k*, thence to the tank-boiler, should the water-supply from the tank be interrupted or should the tank be run empty. The passage of the water from the tank-pipe to the Croton-pipe is, of course, prevented by the check-valve, which only opens upward and which is kept to its seat when water is in the tank by the greater pressure. The pipe *f* is where the hot water leaves the Croton-tank for low distribution. Upward from the boiler it extends into a header (*f*), composed of 1½-inch nipples and tees, from which the pipes *f'3* extend to the different points of distribution, such as butler's pantry, billiard-room, servants' bath, and all points in basement and first floor, and to the "cut-offs" of the different risers to the second floor. In like manner the hot-water pipe, *l*, from the tank-boiler, B, extends into a header, *l*, from which the pipes *l'1* either run to the fixtures on the third floor or to the "cut-offs" of the risers for the second floor. The pipe *f'1* is the warm "Croton" supply to the kitchen-sink, and is stopped in the pipe at the star. The pipe *m'1* is a branch of the pipe *m*, and is the cold Croton water-supply to the same sink, stopping at the same star, the pipes being connected in this manner above the sink for the sake of a symmetrical appearance. In

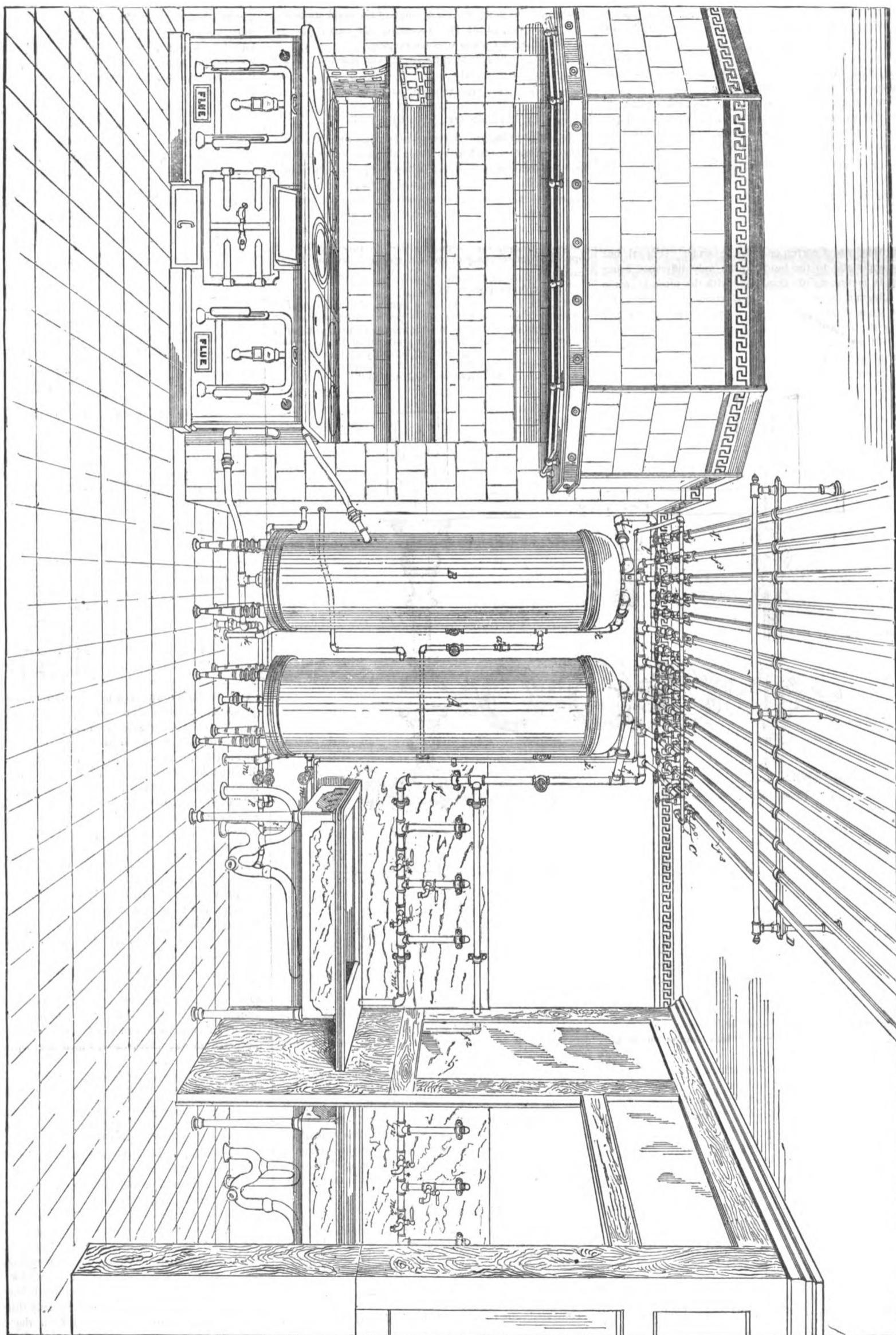


FIGURE 7.—KITCHEN IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

like manner the pipe  $f^2$  conveys warm water to the pantry sink, the pipe  $m^2$  being the cold supply, the star being the dividing point, as before.

The pipe  $j$  is the return-circulation pipe to the Croton boiler, while  $l$  performs the same functions for the high-pressure circulation to the tank-boiler.

There are separate water-backs to each boiler, as plainly indicated in the illustration, the circulation-pipes being as shown. The pipe  $p$ , with its valves, shows the "draw-off" connections of both boilers.

All the pipes shown, except the waste-pipes and air-pipes of the sinks, are seamless-brass pipes, tinned, and the fittings are mostly special and of brass, the couplings being extra heavy with long threads, and all nickel-plated.

Figure 8 is a detail at C, Fig. 7, but the principle applies equally to all the branches of the mains in the house.

In this case  $f$  corresponds to the header  $f$  (Fig. 7), but may apply also to the header  $l$ , the only difference being there is no one-eighth bend used with the pipes  $l^1$ , while the diagram is an exact reproduction of the pipes  $f^2$ . The stops C are gate-valves, and to secure a stop and waste the tee with the cock o is introduced on the fixture side of the stop. The pipe i is a collection-pipe connected with all the cocks and connected with the kitchen-sink, as may be seen at i, Fig. 7.

frame and rail under the lower edge of the hood are brass, and the arrangement for connecting the range with its chimney-flues is such as to show no pipe.

The kitchen floor is of encaustic tiles of selected designs, the colors being neutral.

(TO BE CONTINUED.)

#### SYSTEMS OF WATER-SUPPLY.

IN commenting on our remarks (on page 105, July 3) on the conclusions reached by Mr. Billings as to the relative economy of supplying water to towns by pumping into a reservoir or directly into the mains, *Engineering News* appears to misapprehend our position. We did not object to the statement that "the direct-pumping system is sometimes, at least, cheaper than the reservoir plan," and we agree entirely with the position taken by our contemporary opposing the advocacy of any one special "system" for all cases.

But the *News* goes on to say:

"It takes time to educate a community up to the full value of a water-supply and its proper use; and as the direct-pumpage system is of very recent origin as compared to the reservoir plan, its use is confined to the comparatively new works. This will explain why we find only half as many service-taps in the thirteen direct-pumpage towns as there are in the fifteen reservoir towns."

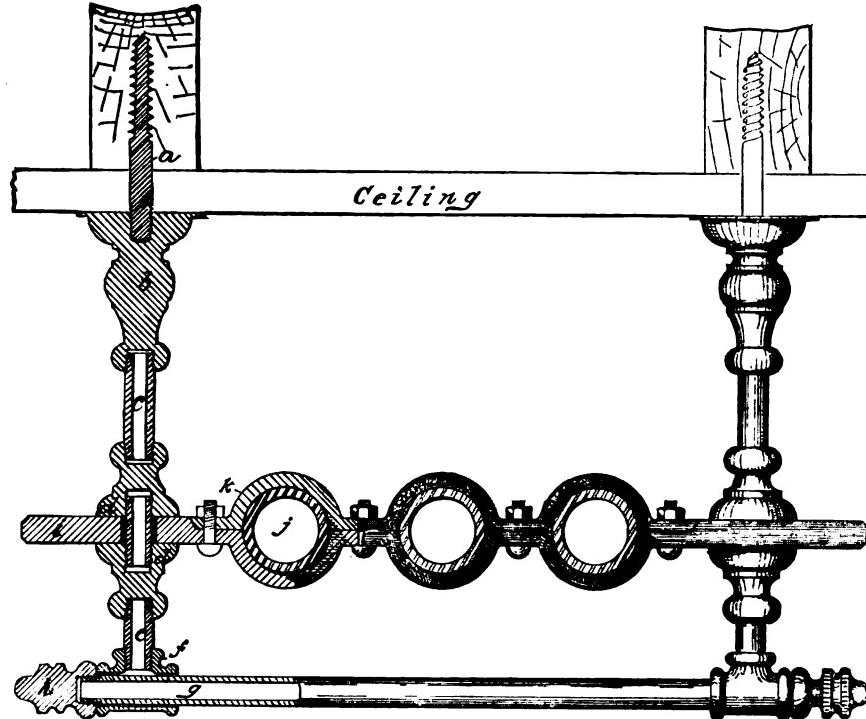


FIGURE 9.—PIPE HANGERS.

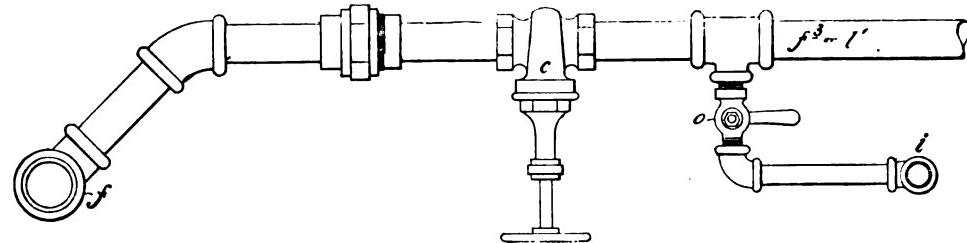


FIGURE 8.—DETAIL OF STOP AND WASTE.

Figure 9 is a detail of the pipe-hangers, D, Fig. 8, and is the same as that used throughout the basement where more than two pipes come together. It was designed with the view to making it adjustable as to height. The component parts, which are special, are the half-inch lag screw, six inches long, and the brass castings, b, d, and h, the other parts, except the bar, i, which holds the pipes, being fittings or pipe. The adjustment is secured by the length of the nipple, C, which is three-eighths of an inch (nominal) in diameter. The pipes and fittings are polished and nickel-plated, and in other respects the hanger is as shown.

The sinks used are of white porcelain, supported in cast-brass frames, with turned legs. The slabs back of the sinks are of reddish-gray marble, against which the pipes are fastened. The arrangement of the traps and air-pipes are shown, and are all plainly, though tastefully, "soiled."

Under the hood over the range is a large register opening into a flue parallel with the range chimney-flue, which latter warms it. This flue is 12"x16" in its cross-section. The hood is lined inside and out with very light-tinted tiles, as are all the walls of the kitchen. The

We regret to be compelled to say that the valuable "statistical tables of American water-works," which furnish the data for all of our comparisons and which are published by our contemporary, do not support these allegations, the average period during which the water-works compared have been in operation being 13.7 years in the thirteen direct-pumpage towns, and 12.1 years in the thirteen reservoir towns, on which the conclusions are based. There are two other reservoir towns, the works of which are a little older, but their consumption per tap is the same as the average of the other thirteen, so that the argument from age falls to the ground, and the problem of the difference in the number of taps remains unsolved.

Our friendly critic goes on to say:

"But in the towns cited the aggregate population is the same, and it is only fair to suppose that in time the average demand will be likewise equal. As the taps increase in number the average rate *per tap* will decrease, and when the number of actual consumers per population is equal, we should say from the above table that the direct system would be much the cheaper."

Here again the facts do not sustain the argument. The

general principle appears to hold good that the average consumption per tap is less the greater the proportion of taps to the population, but in comparing the towns in which "the number of actual consumers per population is equal," the following results appear from the "tables" for the year 1882:

TOWN.	PUMP DIRECT.		PUMP TO RESERVOIR.	
	Gallons per Tap.	No. of Taps.	Gallons per Tap.	No. of Taps.
Memphis, Tenn.	1872	3,250	1875	3,250
Covington, Ky.	1810	2,001	1812	5,833
Ottawa, Ont.	1872	27,412	1834	4,600
Sacramento, Cal.	1840	1,122	1,122	1,190
* Bay City, Mich.	1872	30,063	1874	3,000
Lake, Ill.	1836	18,360	1875	1,577
Bangor, Me.	1875	17,315	1838	590
Binghamton, N. Y.	1838	17,315	1838	1,069
Totals and Averages.....	185,388	14 yrs.	23,338	941

\* From the report for 1883.

Here are eight towns of each class with very nearly the same population, age, and number of taps, but the direct-pumpage supply consumes twice as much water as the reservoir-supply, so that the argument from the relative number of taps fails to the ground. In this connection we would call the attention of our critic to the fact noted by Croes & Howell in their report of 1879 on the Newark water-supply, that in Boston, Brooklyn, Chicago, and Newark, as the number of taps increased, the consumption per tap increased also, which they attributed to the increasing use of water by hotels and manufacturing establishments. The same proportional increase will be found in examining the records of other towns, we think.

The *News* very justly remarks that "under proper management and regulation of pressures, the amount per tap delivered should be practically the same with either system." This is precisely where the trouble lies in a poorly-managed direct-pressure system. The Taunton experience shows that a well-managed direct-pressure need not waste any more water than any other system, but the above figures show that the tendency is to use an excessive amount of water, and the cause of it is probably a lack of "proper management and regulation of pressures" under the ever-varying conditions of a direct-pressure pumping.

The critic adds:

"We do not see either how the question of ownership affects the choice of systems. The public administration of a water-supply is generally conceded to cost more than the private management of similar works; but this rule applies equally well to all other public works and would be felt whatever system was in use."

The question of ownership affects the choice of a system in this way: When water-works are owned by a private corporation the cost of maintenance, interest on debt, and profits to owners must be got from the purchasers of the water—that is, the consumers. The company desires to furnish the required water at the least expense. The figures given in the statement we published show that this can be done more economically by direct pumping, the total annual expense for interest and maintenance for furnishing 24,000,000 gallons daily by this method being \$599,593, and for furnishing 22,000,000 gallons daily through reservoirs being \$732,108, as deduced from the records of

danger of the living from noxious effluvia or from contagion from the bodies of the dead occurs before, and not after, the interment of the latter. Our attention has just been called to an editorial in the London *Globe* of June 16, commenting upon some papers on disposal of the dead presented at one of the health conferences, which are being held in connection with the Kensington Sanitary Exhibition; and this editorial contains so much sensible advice that it should be brought to the attention of all sanitarians.

The writer remarks that "the airing of brand new schemes for the entire revolution of manners and customs is premature, while the problems affecting ordinary daily life remain unsolved," and takes the ground that any radical reform in the disposal of the dead is a matter of very slight moment, and that the perils to which the living are exposed by the dead are due to breaches of the commonest rules of decency connected with the conditions in which life is carried on. He comments on the impracticability of the scheme proposed by Mr. Wynter Blyth, an abstract of which we give in another column, and remarks that the public must have been amused, the paper being as good as a romance. "It is not because we bury our dead under tombstones in cemeteries and church-yards, that the poor keep corpses in sleeping-rooms and pauperize themselves in order to have a fine funeral." \* \* \* And this being so, no sort of sympathy can be bestowed on vague, Laputa-like dreams, reaching thousands of years forward to find a limit, in order that visitors to the crotchet department of the Health Exhibition may have a fresh subject of entirely useless conversation."

While our friend of the *Globe* is perhaps a little too sweeping in his condemnation of new propositions, since every reform must have a beginning, and seem rather absurd to those who are naturally strongly conservative, it is nevertheless true that it is a dangerous thing for a sanitarian to attempt to attract public attention by being sensational, for in the long run he usually loses more than he gains.

Sober, sensible people, who consider his propositions from a practical and business point of view, are apt to conclude that a man who is pyrotechnical and skyrockete in one point is an unsafe guide everywhere.

The man who employs all the superlatives in the language to depict the evils connected with earth burial, or with corsets, or adulterated vinegar, or some other pet bugaboo, destroys confidence in his judgment, and when he comes to warn people of the real and great perils to health which surround them, his utterances receive little attention.

The sensational speaker or writer is, by the majority of people, supposed to be desirous of attracting attention to himself rather than to his subject. And, while such a supposition is unjust in some cases, it must be confessed that it satisfactorily accounts for the performances of several "sanitary reformers" that we are acquainted with on this side of the Atlantic.

#### SCIENCE IN TRADE.

In a recent number of *Nature* the editor discourses on "Science and Manufactures," urging the application of the scientific spirit to the things of common life, and that to maintain industrial supremacy there must be a close connection between practical construction and theoretical investigation.

The importance of scientific investigation in sanitary matters is a thing we have often had occasion to insist on, and is, in fact, the urgent need of the present day. This is well known and generally assented to by the public, and the fact that a general demand for it exists is sufficiently proved by the vast amount of pseudo-scientific literature which is being produced as the best means of advertising certain things and persons. The merits of certain baking-powders, disinfectants, water-closets, ventilating-cowls, etc., etc., are set forth by certificates of analyses

and tests given by Professor So-and-so, and the preparation of such certificates is becoming a rather lucrative profession. While many of these certificates and elaborate puffs in the shape of formal papers are prepared by men who are so entirely unacquainted with scientific methods that they betray their ignorance and the mercenary motives which actuate them in almost every sentence, there are a few who possess enough knowledge of chemistry and physics to avoid making gross blunders, and are yet not over-scrupulous in the use which they will make of their knowledge if a sufficient pecuniary consideration be presented.

It is true that such men are rare, for scientific training fosters the love of truth, and the amount of patient work which it demands is such as to have a strong tendency to secure the survival only of the fittest, which in this case means those who will make an honest and proper use of the knowledge they have obtained. Nevertheless, a man *may* be a scientific man and at the same time very shaky in his morals, and such men are very dangerous. There is comparatively little danger, however, from the professional certifiers, seeing that it has now come to be generally understood that such certificates convey really reliable information rather with regard to the character and pecuniary necessities of the men who make them than in regard to the articles to which they relate.

WHILE the movement is on foot for a new building for the United States Assay Office on Wall Street in this city, THE SANITARY ENGINEER wishes to call attention to the necessity for a chimney and aspirating-shaft, at least one hundred feet higher than the present chimney. When the present Assay Office building was put up, undoubtedly a chimney one hundred and forty feet or so high was sufficient to carry the sulphurous and other fumes far above the upper windows of the surrounding buildings; but now, when the wind is favorable, these fumes are carried to the windows of the Drexel building, the Mills, the Mutual Life, and other high buildings in that neighborhood. With a chimney sufficiently high, these fumes, even though they should be deflected downward, would be diffused sufficiently not to produce coughing in the most sensitive lungs.

#### FUND TO PAY THE LEGAL EXPENSES OF ARCHITECTS.

THE French architects, at their late congress, heard with applause of a project for creating a fund which will be available for the defense of the interests of architects. The entrance fee is proposed to be thirty francs and the annual subscription twelve francs. It often happens in France as in England that an architect suffers from clients and public bodies because he is unable or is afraid to undertake the risk of law expenses. In England there is the additional annoyance to him that his institute will take no recognition of his difficulties, however grievous they may be; but the French society is not likely to allow a member's rights to be sacrificed to the timidity of a few under the guise of dignity and the "interests of the profession in general." The funds of the proposed society will not be available unless the council can find, after investigation, that the case is one which demands their interference, and it is possible that the society may often be enabled to keep cases out of the courts. The members will have the satisfaction of feeling that in a difficulty they will be sustained by the influence of the society, which can be exercised in other ways besides advancing money for law costs.—*London Architect.*

#### SANITARY CONFERENCE.

DR. JOHN RAUCH, Secretary of the Illinois State Board of Health, has suggested that the National Sanitary Conference of representatives of State Boards of Health meet at Washington early in August, to secure concerted action by health authorities against the spread of epidemic diseases, especially cholera. The conference will meet August 7. Quarantine officers of all the principal Atlantic and Gulf ports, members of the Ontario, Can., Board of Health, and other medical authorities of the Dominion, as well as health officials of American cities and States, are expected to be present.

#### PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

##### No. IV.

(Continued from page 146.)

THE illustrations, Figs. 10 and 11, pages 193 and 195, are views at opposite sides of the laundry in the Marquand house.

The room is 21 feet square, with encaustic-tile floor, and the walls are of white-glazed tiles with encaustic border.

The wash-trays are of white porcelain, six in number, and in the position shown. The range is only for laundry purposes, and is furnished with two U-shaped water-backs, which surround the fire at three sides, each having a separate grate and fire, *a* being the position of the boiler-back, while at *b* there is a water-back especially provided for a hot-water circulating apparatus, to which are connected the pipes *b*<sup>1</sup> and *b*<sup>2</sup>; the particulars of the fittings will be given in a later issue in connection with a description of the "drying-room." At *c*, on the range, is a copper boiler of from 25 to 30 gallons capacity, for boiling clothes or warming extra quantities of water, which is furnished with a draw-cock at the end of the range.

The Croton water-pipe *m*, Fig. 10, under the floor, branches into the pipe *m* to the tubs, the pipe *j* to the cut-off *D*, and the pipe *e* to the boiler *d*, returning warmed from the boiler through the pipe *f*. The pipe *f* dips below the floor where it branches to the pipe *i*, Fig. 10, and the pipe *b*, Fig. 11, to supply the trays with warm water. In case of there being no fire in the laundry range, the valve *g* can be opened, when warm water will be admitted from the "Croton" range in the kitchen, passing through the pipe *h*. The pipe *h* is the warm Croton pipe from the kitchen boiler to the "cut-off" *D*, the pipe *i* being the warm tank-supply from the tank-boiler in the kitchen. The cold supply to the "cut-off" *D* is through the pipes *j* and *k*, *j* being the Croton and *k* the tank-supply. The pipes *s* and *t* are the hot and cold supply-pipes from the cut-off *D* to a bath-room over this part of the house, *t'* being the return or circulation-pipe, which below *E* returns respectively to the Croton or tank-boiler. The star at the back of the wash-trays indicates where the pipe is plugged to separate the hot from the cold water, *m'* being the air-chamber of the cold-water pipe. At *r* over the range, and within the hood, is a register for taking the warm air from over the range. It connects with a flue parallel with the chimney-flue, the latter being depended on for warming and rarefying the air within it. The pipe *b*<sup>1</sup> is the pipe leading to the drying-room coil, *b*<sup>2</sup> being the return-pipe of the same.

In Fig. 11 the pipe *c* is the warm supply to the tubs, and *b* the cold supply. The pipe *c'* is the air-chamber of the warm pipe, *d'* performing the same duties for the cold supply; the stars showing where the pipes are plugged. The waste-pipes and trap *e* are of heavy lead, the air-vent *d* being brass.

Figure 12 is the detail of the support of the waste-pipe underneath the tubs. The pipe itself is heavy lead, and is represented in the figure by the letter *a*; *b* is a segment of 3-inch brass pipe, and *c* and *d* are smaller segments, but of longer radii. *c* and *d* are sweated together, and *e* is sweated to them; *f* is a piece of ordinary brass pipe one inch (nominally) in diameter, and *g* is a brass casting. It will be noticed that *g* is threaded, and that the pipe *f* screws into it, but that *e* is not threaded, being simply fitted into it. This is done to get a more satisfactory adjustment as to length, so that all of the pedestals would have equal bearings on the floor, and is accomplished by revolving the pipe *f* with a pair of tongs, the pipe simply revolving in *e*, but screwing in or out of *g* as the case may be. The brass pipes are all tinned, and the fittings plated. Other information may be obtained from a careful study of the pictures, which are very faithful representations.

(To BE CONTINUED.)

actual knowledge of our subject as it applies to our locality. To our own knowledge the engineer now in charge of one of the largest buildings of the class under consideration was the engineer of a Hudson River steamer. He applied for the situation, and having a certificate as a "marine engineer," the owners thought he must be the best man for the place of all the applicants, though some had had charge of such a building before. This man got the appointment, and knowing his own ignorance of the equipments of such a building, went to the engineering contractors who furnished it, and employed one of their skilled mechanics to remain with him two weeks, paying for him more than his own salary for the same time.

This does not prove the man an ignoramus—rather the reverse—but all men who creep in at a cabin-window and appear on the quarterdeck as master are not furnished with a *mate* who came in through the "hause-hole" and came aft on deck.

#### OUR BRITISH CORRESPONDENCE.

*Small-Pox Epidemic in London—Thames Water—Conference on Water-Supply—Smoke Abatement—Dinner of the Executive Council of the Health Exhibition—Talk About Cholera.*

LONDON, July 19, 1884.

THE Local Government Board has directed one of its medical officers to institute an inquiry into the character of the present small-pox epidemic in London. The inquiry will commence in the districts of Fulham and Chelsea.

Dr. Frankland reports that the Thames waters delivered in June by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Water Companies were, for river-water, remarkably free from organic matter. The Lea water distributed by the New River and East London Companies contained more organic matter and more impurities than any of the Thames waters. Efforts are being made to improve the condition of the river Thames, which for some weeks past has been in a very bad state. Prior to the complaints which have recently been made in Parliament, the Metropolitan Board of Works ordered that the sewage discharged at the two great outfalls in Barking Reach should be deodorized, and sanctioned the use for this purpose of 140 tons of chloride of lime per day. As the chloride of lime costs £9 per ton, the cost of deodorizing will amount to a considerable sum.

At the conference on Water-Supply by the Society of Arts, to be held at the Health Exhibition on the 24th and 25th inst., the papers and discussions will be arranged under the following heads: 1. Sources of Supply. 2. Quality of Water, Filtration and Softening. 3. Methods of Distribution, Modes of giving Pressure, House-Fittings, Discovery and Prevention of Waste, etc. The readers of the papers will be restricted to twenty-five minutes, and the speakers will have ten minutes each. Most of the papers to be read will be printed and distributed in the room.

At a public meeting held at the Mansion House on the 15th inst., with respect to the question of smoke abatement, it was stated that smoke-preventing appliances were being widely adopted with satisfactory results by bakers, glass-stainers, confectioners, restaurant-keepers, coke manufacturers, and other traders, with evident advantage to themselves and the community. Lord Mount Temple, the chairman of the meeting, stated that London could be made the best residential city in Europe if only we could get rid of the smoke. A Smoke-Nuisance Abatement Bill has recently been introduced into Parliament, but the prospects of its passing during the present session are very remote.

The Lord Mayor entertained the Executive Council and Commissioners of the Health Exhibition at dinner at the Mansion House last Saturday. In replying to the toast of the "Executive Council of the Exhibition," Sir T. Paget, the Vice-President, said the evidence of the success of the exhibition, so far as numbers went, was plainly apparent, for up to that day 1,150,000 persons had visited the exhibition, a great increase over the number of visitors at the Fisheries Exhibition last year during the like period. So far as the question of health was concerned, Sir T. Paget said the success would not be apparent immediately. They must look thirty years hence to see what effect had been

made in teaching the people what were the best means of securing health. The true and final success of the exhibition depended very much upon the commissioners and jurors, for it was they who were to put their mark of excellence upon the exhibits.

The cholera forms an important subject of conversation and of newspaper articles, and if it comes we fear that the way is being prepared for a harvest of victims among nervous people. There are, of course, two ways of looking at the matter. Professor Tyndall, presiding at a lecture given by Dr. George V. Poore on "Thrift in its Relation to Health," considered it a good thing that the people were being educated by the press and by the conferences and lectures of the Health Exhibition, and expressed the opinion that if the cholera came it would be met in a much more sensible manner than it has been on the Continent.

The Local Government Board has called the attention of the local sanitary authorities to the powers which they possess in respect to the detection and prosecution of adulterations, and has asked for the more efficient increase of their authority.

The City Commissioners of Sewers have resolved "in all instances where new houses are being erected to place themselves in communication with the builder or owner of the property, and treat with him or them for the construction of a proper ventilating-shaft in the chimney-breasts or party or other walls for the purpose of ventilating the sewers, carrying the ventilating-shafts well above the adjoining roofs." These ventilating-shafts are intended to take the place of the openings in the middle of the street, and thus prevent the entrance of foul air into the neighboring houses.

SAFETY-VALVE.

#### PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

No. V.

(Continued from page 192.)

THE illustration, Fig. 13, is a view in the clothes-drying room of the Marquand house, with one of the clothes-horses drawn out.

There are eight horses, eight feet long and eight feet high, each provided with eight wooden bars to hang the clothes on, instead of the conventional wire. The bars are in pairs, as shown, and are rounded on the top edges to hang the clothes over. They are made of 2"x6" *whitewood*, and are mortised into the front and back boards and fastened with rail-bolts, the nuts being embedded in the bars. No bracing is used, the number and depth of the bars being sufficient to prevent swaying.

The frame and track overhead, on which the wheels of the horses run, is 4"x4" *ash*, and is suspended from the ceiling by bolts screwed into the joists. At the centre each scantling is supported by the fixed jamb between the horses, and against which the horses close. The jambs and panels are *ash* and the handle bronze. Figure 14 is a detail of the manner of hanging the horses; *b b* are a pair of the 4"x4" scantlings which form the tracks, *a* is the front or back of a horse, and *c* are the wheels of cast-iron. On the scantlings no iron is used, and rubber bands are to be sprung over the wheels to prevent noise.

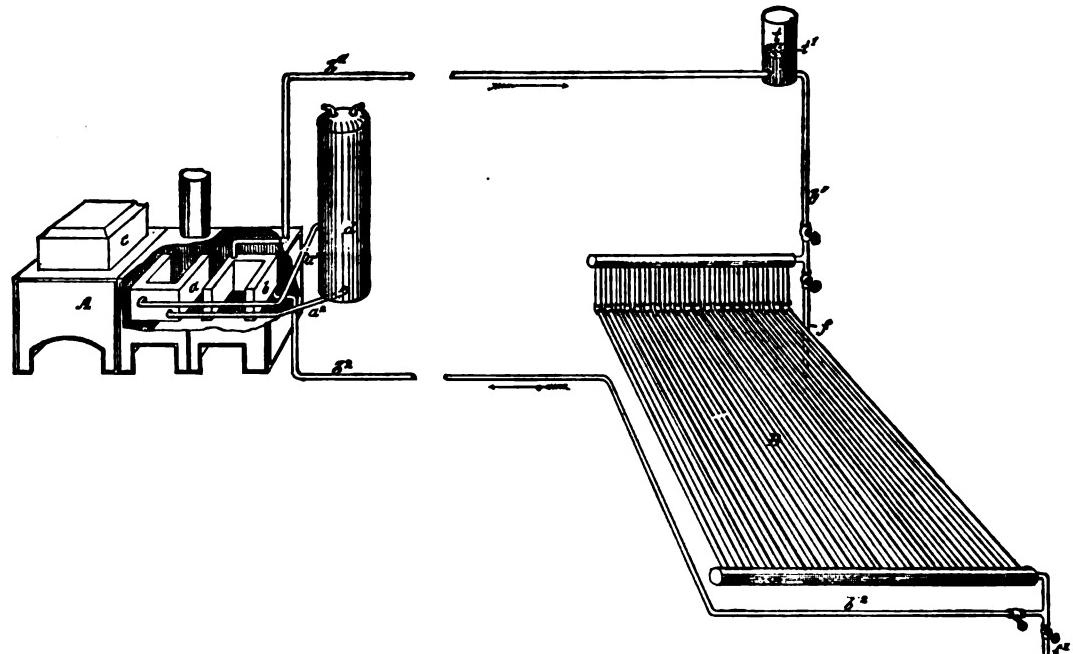


FIGURE 15.—DETAIL OF TWO WATER-BACKS IN LAUNDRY RANGE.

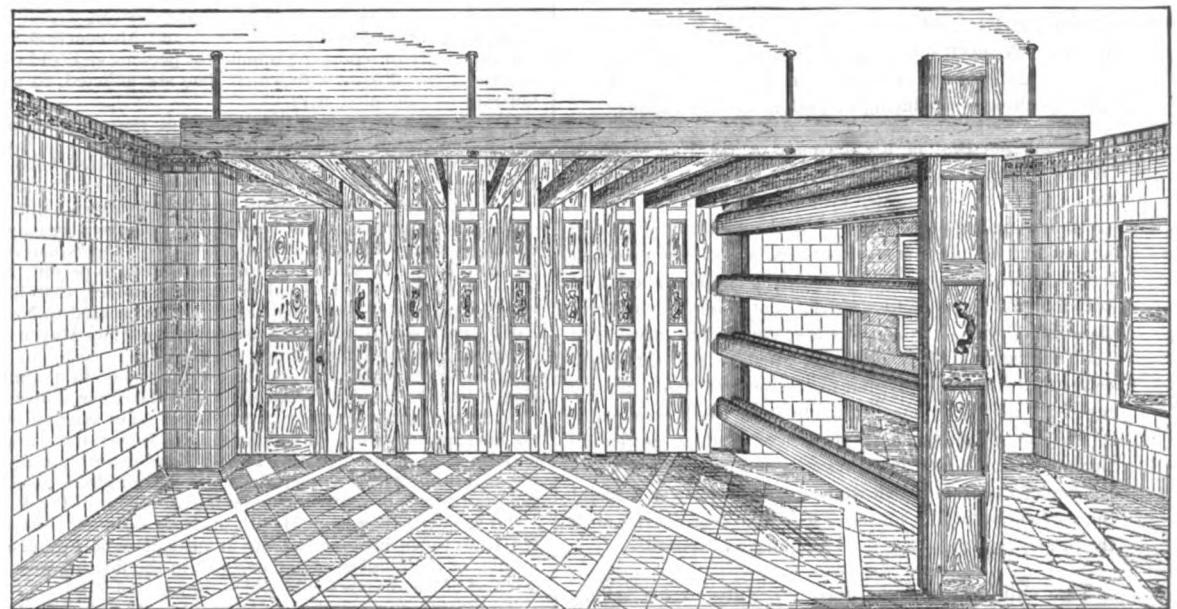


FIGURE 13.—VIEW IN CLOTHES DRYING-ROOM OF THE MARQUAND HOUSE.

The ventilation is from the upper part of the drying-chamber, through a brick flue of one and one-half square feet of cross-section, which extends direct to the roof, the air entering at the feet of the horses under the heating-coil.

Figure 15 is a detail of the two water-backs in the laundry-range shown in Fig. 10, page 193, and their relation to the hot-water boiler and the drying-room coils. The water-back *a* surrounds the first fire-place of the range, and connects with the domestic boiler by the circulating-pipes *a<sup>1</sup>* and *a<sup>2</sup>*. The water-back *b* surrounds the second fire-place, and connects with the hot-water coil *B* by the pipes *b<sup>1</sup>* and *b<sup>2</sup>*. This arrangement is to provide for warming the drying-

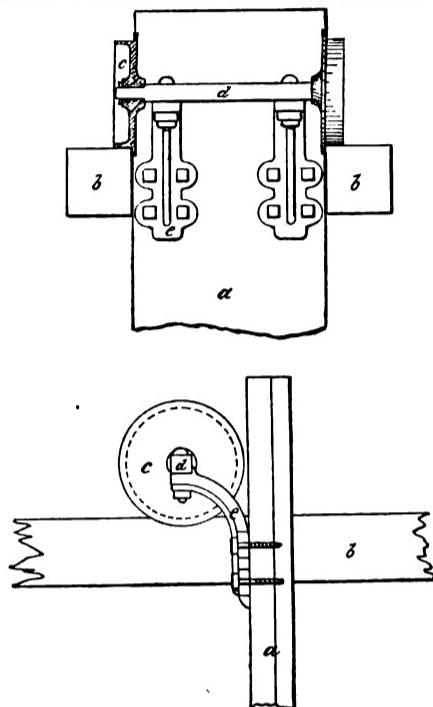


FIG. 14.—DETAIL OF MANNER OF HANGING HORSES IN DRYING-ROOM.

room coil in the summer time, or when there is no steam in the boiler. It is in substance a low-pressure hot-water apparatus, with an open expansion-chamber at *t*. The arrows show the direction of the circulation of the water when it is used as a water-apparatus. To convert it into a steam-apparatus, the valves in the pipes *b<sup>1</sup>* and *b<sup>2</sup>* are closed, and those on the pipes *f* and *f<sup>1</sup>* are opened. This allows the water in the coil to run through the pipe *f<sup>1</sup>* into the return-pipes of the regular steam-heating apparatus of the house and the steam-circulation to go on through the pipes *f* and *f<sup>1</sup>*, the former being the steam-supply.

The warming engineers of this building are Messrs. Bramhall, Deane & Co., of 274 Front Street, New York.

(TO BE CONTINUED.)

THE water from the coal mines along the Youghiogheny River, in Pennsylvania, is poisoning that river, into which it flows, and the fish are dying in great numbers. Their decomposition is producing foul odors along its banks.

By the bursting of a water-main of the East London Water Works Company, on June 28, the roadway of Clapton High Road was thrown up with great force, and concrete and paving-stones shattered the windows of several houses and wounded several persons, and threw a passing horse-car off the track. This company supplies about 48,000,000 gallons a day to a district containing nearly a million inhabitants. Its reservoirs cover 220 acres and hold 720,000,000 U. S. gallons. Most of the district receives a constant supply, but in one portion the company reports that "the greatest disinclination has been evinced on the part of consumers and owners to adopt proper fittings to meet the increased pressure, and the waste of water has been so enormous that we have had literally to suspend the application of the constant service in that district until the proper remedies have been established."

TEN milk-dealers were fined on July 19 for selling skimmed and watered milk in Brooklyn. Three hundred and one dollars in fines were received.

#### THE QUARANTINE DEFENSES OF NEW YORK.

A MARITIME quarantine for the protection of the public health of New York was established as early as the year 1758, but it is under the General Quarantine Act of April 29, 1863, and its subsequent amendments, that the present quarantine is administered. The quarantine establishment consists (1st) of an outer boarding-station—a ship at anchor in the lower bay, five and one-half miles from the Narrows and twelve and one-half miles from the Battery, or the extreme lower end of Manhattan Island; (2d) an outer quarantine roadstead in the lower bay about one mile inside the outer boarding-station; (3d) an artificial island (Swainburn's Hospital Island) containing ten detached hospital buildings, two and one-quarter miles outside the Narrows; (4th) Hoffman Island, one mile nearer the Narrows, and an "observation station" containing buildings for the accommodation and observation of 1,500 persons; (5th) the upper quarantine roadstead, just inside the Narrows, and the regular boarding-station, the year round, for all vessels, and where the affairs of quarantine are administered, including residences for officers and men, about one mile south of Clifton Landing; and (6th) Robbins' Reef Anchorage, where infected vessels are discharged and cleansed.

The affairs of quarantine are administered by a quarantine commission of three members and the Health Officer of the Port, appointed by the Governor and confirmed by the Senate, and the Mayors of New York City and Brooklyn are *ex-officio* members of the commission.

The Health Officer, under the law, must be a doctor of medicine in good standing, with ten years' experience in the practice of his profession, and be practically familiar with the diseases subject to quarantine. His duties are the general superintendence and control of quarantine, and the care and treatment of the sick, and the carrying out of all the provisions of the law and regulations. He has power to administer oaths and take affidavits. He can at all times call upon the metropolitan police to the number of ten to aid him in an emergency to enforce the duties conferred upon him, or to direct in writing any constable, or even citizen, to pursue and apprehend any person violating quarantine law or regulations, and can detain such persons ten days. A person obstructing the Health Officer is guilty of a misdemeanor punishable by a fine not less than one hundred nor more than five hundred dollars, or by imprisonment from three to six months. He has power to appoint or dismiss at pleasure all employees under himself, and, in conjunction with the Quarantine Commissioners, to license lightermen, stevedores, and as many other as may be found necessary for the care and purification of vessels, merchandise, baggage, etc. The law provides for two Deputy Health Officers, whom he appoints and whom he is directly responsible for, and who are authorized to perform all the duties in his absence. The Health Officer, his deputies and assistants take an oath of office. His prescribed duties are:

To board every vessel subject to quarantine or visitation by him, as soon as practicable after her arrival; to inquire as to the health of all persons on board, and the condition of the vessel and cargo, by inspection of the bill of health, manifest, log-book, or otherwise; to examine, on oath, as many and such persons on board as he may judge expedient to enable him to determine the period of quarantine and the regulations to which such vessel and her cargo shall be made subject; and to report the facts and his conclusions, and especially to report the number of persons sick and the nature of the disease with which they are afflicted, to the Quarantine Commissioners.

To exercise dispatch in the disposal of persons arriving in infected vessels; to have the bodies of persons who have died of malignant diseases on board of infected vessels arriving, and such as shall have died in the hospital, interred in the quarantine burying-ground; and to proceed, without delay, in the purification of vessels, merchandise, baggage, dunnage, and other articles in quarantine; and whenever he shall judge the same free from infection, to permit the removal thereof. No vessel or cargo, however, that has been in quarantine, shall be permitted to proceed to New York or Brooklyn without the approval of the Mayor or Board of Health of those cities respectively.

To secure the effects of the deceased persons, in quarantine, from waste and embezzlement, and make a true inventory thereof, and when the rightful claimants of such effects do not appear within three months, to deliver the same, with such inventory, to the Public Administrator, unless the said property be of such description as ought not to be removed or may be destroyed under the provisions of the Act.

To keep the Boards of Health of New York and Brooklyn at all times informed of the number of vessels in quarantine, of the number of persons sick in the floating hospital, and of the diseases with which they are afflicted.

To receive any vessel or merchandise sent to him by the health authorities of New York or Brooklyn, dangerous to the public health.

To receive into the floating hospital any case of yellow fever that shall have been contracted in quarantine establishment or elsewhere.

To have all vessels, warehouses, and merchandise in quarantine designated by a yellow flag; and to prohibit communication with, or passage within range of, such vessels and places, except under such restrictions as he may designate as being compatible with safety.

Whenever the Health Officer, in the performance of his duties, and in the execution of the powers imposed and conferred upon him by law, or by any regulation or ordinance made in pursuance of any statute of this State, shall order or direct the master, owner, or consignee of any vessel subject to quarantine to do any act or thing, or comply with any regulation, relative to said vessel, or to any person or thing on board thereof, and said master, owner, or consignee shall neglect or refuse to comply with such order or direction, the said Health Officer shall have power to employ such persons and assistance as may be necessary to carry out and enforce such order and direction, and the persons so employed shall have a lien on such vessel, her tackle, apparel and furniture, for their services and expenses.

Vessels arriving at the port of New York are to be subject to quarantine as follows: All vessels from infected ports, or which shall have arrived at any such place, and proceeded thence to New York, or on board of which during the voyage any case of such disease shall have occurred, or vessels from any place (including islands) in Asia, Africa, or the Mediterranean, or from any of the West Indies, Bahama, Bermuda, or Western Islands, or from any place in America, in the ordinary passage from which they pass south of Cape Henlopen.

#### WHAT DISEASES ARE QUARANTINABLE.

The only diseases against which quarantine applies are, yellow fever, cholera, typhus or ship fever, and small-pox, or any disease not now known, of a contagious, infectious or pestilential nature.

Merchandises subject to quarantine are: (1) Clothing, personal baggage, dunnage, rags, paper-rags, hides, skins, feathers, hair, and all other remains of animals, cotton-hemp and woolens, on which quarantine is obligatory. (2). Sugars, silks, linen, and cattle, on which it is optional.

The law provides that the Commissioners of Emigration shall receive into their hospitals all alien passengers arriving at the port of New York who shall be affected with any contagious or infectious disease other than yellow fever. For this reason small-pox patients are sent to Blackwell's Island, and typhus or ship fever patients to Ward's Island; the cholera or yellow fever patients to be taken care of by the Commissioners of Quarantine, at their hospitals on Swainburn's Island.

Of the duties of pilots in relation to vessels subject to quarantine, the law requires that a pilot must use his utmost endeavors to hail every vessel he shall discover entering the port, and to interrogate the master in reference to all matters necessary to enable him to determine whether such vessel is subject to quarantine, and he has the power to order the master to proceed to the anchorage in the lower bay, if quarantinable diseases are found on board.

The routine of quarantine, in brief, is—vessels from infected ports are brought by the pilot to the lower boarding-station. The Deputy Health Officer there examines her, transferring the sick (if any) to Swainburn's Island, and those that have been exposed to Hoffman Island until after the period of incubation of the disease is passed, where their clothes and persons are washed, and what will not wash fumigated. Vessels from England, or from presumably healthy ports, pass to the upper boarding-station, where they are examined and allowed to pass, or returned to the lower grounds, as the case demands.

If, in the judgment of the Health Officer, the vessel requires it, he may order the following sanitary measures: Baths and other bodily care for the person; washing or other disinfecting means for clothing; displacement of merchandise on board, or complete breaking out of the vessel; subjection to high steam, incineration, or submersion at a distance below the surface of the water, for infected articles; the destruction of tainted or spoiled food or beverages; the complete ejection of water; thorough cleansing of the hold, and the disinfection of the well. In short, the complete purification of the vessel in all her parts, by the use of steam, fumigation, force-pumps, rubbing or scraping, and saturation with a solution of sulphate of iron, and finally sending to quarantine anchorage until disinfection be perfected. Whenever these operations are necessary, they shall always be executed before admission to pratique.

Persons with insufficient evidence of vaccination are not allowed to proceed until they are vaccinated.

WE cannot answer "Apprentice," of Jersey City, until we receive his name and address.

A STAGNANT pool in the central part of the village of Fairport, New York, has become a public nuisance, and the Village Trustees have appealed to the State Board of Health for its abatement.

One man, Joel W. Hooper, has made an application to Judge Bartlett, in Supreme Court Chambers, to compel the Commissioners of Police to issue to him a certificate, he having qualified and been accepted as competent, but refuses to pay the fee, on the ground that engineers should not be assessed for the benefit of the Police Pension Fund.

#### SANITARY NOTES.

AN epidemic of diphtheria is at present raging at Hamilton, Ont., and its victims are to be found in the southwestern part of the city, which has always been considered one of the healthiest localities. As to the cause of the disease, various theories have been advanced, among them defective sewerage and faulty plumbing in the residence where the disease has been discovered. The west-end sewer comes in for a fair share of blame, as well as milk which has been supplied to residents in the district named. The physicians advise all parents and others to examine their children's throats several times during the day, and gargle their throats with a weak solution of salt and water. The epidemic is directing the attention of the authorities to the connecting of houses with sewers already built, for at present a landlord is not compelled to make the connection, and the result is that a sewer may run along a given street, but for the lack of that connection the tenant derives no benefit from the sewerage, and the sewer, so far as these houses are concerned, might as well never have been built.

AN investigation of the sources of pollution of Wissahickon Creek has just been completed by Assistant Engineer Dana C. Barber, and submitted to Chief Engineer Ludlow, of the Water Department of Philadelphia, who will present it at the next meeting of Councils. The chief causes of pollution are within the city limits, the drainage of the hotels along the creek being especially objectionable. Half a dozen hotels, with drains directly connected with the Wissahickon, are the cause of serious and offensive pollution to the waters. On Cresheim Creek several houses on Germantown Avenue aid in the pollution, as their drains are connected with this tributary of the Wissahickon, and below Germantown the shoddy mills of David Kelly, says the report, "are surrounded by very filthy yards, and several houses contribute much pollution to the stream, these having wells with loose stone vaults close to a small tributary of the creek, and throwing kitchen waste near the banks."

A HARTFORD alderman has risen in his wrath and declared his right to be as dirty as he chooses to be without interference. The occasion was the discussion of the health ordinance pending in Common Council, July 15. No such invasion of the sanctity of the home as was proposed by the ordinance had been known, according to our alderman, for three centuries. It was clearly a violation of the provision of the Constitution of the United States, which declares every man's house his castle.

THE Board of Health, of Providence, R. I., has declared quarantine against all vessels from foreign ports, except those of British America.

A SUB-COMMITTEE of five has been appointed by the Committee on Public Buildings of the Court Board, St. Paul, Minn., to look into the cost of a morgue and report plans of construction.

THE publishers of the *Deutsche Vierteljahrsschrift für öffentliche Gesundheitspflege* have begun the issue of an annual record of the progress of public hygiene under the title of *Jahresbericht über die Fortschritte und Leistungen auf dem Gebiete der Hygiene im Jahre, 1883*. The editor is Dr. J. Uffelmann, of Rostock, and this first annual volume contains 244 pages.

THE cholera scourge now prevailing in Europe calls to mind the experience of Boston in 1849.\* At this time the population of Boston was about 135,000. The total number of cases of cholera coming under the direct supervision of the Board of Health was 707; of this number 611 proved fatal; 385 were males and 322 females. There were a very large number of cases besides those of which there was no record kept.

\* Figures taken from the report of the Committee of International Health on the Asiatic Cholera in Boston in 1849.

#### OUR BRITISH CORRESPONDENCE.

*Selling Unwholesome Meat—Proposed Cholera Commission—Captain Douglas Galton on Coal-Fires—Ventilating the Sewers—The Hospital Fête—Electric-Lamps for Iron Works—Scarlet Fever Epidemic at Leek—Mortality from Cholera at Toulon.*

LONDON, July 26, 1884.

SEVERAL cases have been before the police courts lately, in various districts, of selling food unfit for human consumption. One of the worst of the kind was the case of a butcher at Stoke, who was a day or two back fined £10 and costs for having in his possession two hundredweight of meat which was unfit for human food. The Medical Officer of Health said that the meat was so bad that when a piece was taken up on the end of a stick it fell to pieces of its own weight. The only defense the man could offer was that the meat was intended for pig's food.

The *British Medical Journal* is responsible for the statement that the Government intends instructing an eminent pathologist and physiologist connected with one of the London hospitals, and whose work in the investigation of minute organisms related to disease is of recognized authority, to proceed to India for the purpose of investigating the pathology and causation of cholera.

Captain Douglas Galton, in his lecture on "Ventilation in Connection with Warmth and Lighting," before a crowded audience at the Exhibition last week, said the amount of coal consumed in London was out of all proportion to the heat produced. The open fire was the most wasteful method for warming a room, though it was a great engine of ventilation. He suggested that buildings should be warmed by means of hot air or steam-pipes from a fire in a central position, or by means of gas. In the United States the system of heating by hot air, he stated, was now becoming universal.

At the meeting of the City Commissioners of Sewers, held at the Guildhall on Tuesday last, the following resolution, proposed by Mr. Scott and seconded by Mr. Boor, was carried: "That in all instances where new houses were being erected, the Commissioners of Sewers should place themselves in communication with the building or other owner, and treat with him or them for the construction of a proper ventilating-shaft in the chimney-breasts or party or other walls, for the purpose of ventilating the sewers, carrying the ventilating-shafts well above all the adjoining roofs."

Mr. Rose-Innes, the chairman of the Sewers Commission, states that if any resident in the city has cause to complain of any smell from the city sewers, he has only to procure the consent of the owner of the adjacent property, and the Sewers Commission will, without delay, put up a ventilating-shaft, free of expense.

The hospital fête at the Health Exhibition on Wednesday last was a great success. The grounds looked remarkably well, with the thousands of colored lights, the illuminated fountains, and the electric-light, and everything passed off most successfully. Though not inconveniently crowded, the place was quite full of people, and considering the rather high price of admission—viz., ten shillings—it is to be hoped the London hospitals will reap a substantial benefit from the fête. The dairy and flower stalls were presided over by members of the nobility, and a good business was done in selling milk, fruit, and flowers, the prices asked and received being considerably in excess of the intrinsic value of the articles sold. A novel effect was produced by exhibiting two of the Guernsey heifers at the Express Dairy Company's stall, ornamented with electric-lights on their heads, the necessary machinery for the lights being concealed in a wreath of flowers placed around the animals' necks.

The new British Iron Company (Limited) now light their works at Corngreaves, near Cradley, with the Weston arc-light, the electrical plant being supplied by the Maxim-Weston Electric Company. The installation of the electric-light is said to have proved most successful, both as regards efficiency and economy, as compared with gas.

At a recent meeting of the guardians of Leek, when the scarlet fever epidemic came up for discussion, a sanitary inspector reported that he had found in the rural district a case being treated in a room where cheese was stored ready for market; another where the person in the height of the

fever was making cheese; at a third, where the person affected was milking cows; and a fourth, where an attendant upon a very bad case was preparing a large quantity of milk for the railway station. The disclosures, it is said, have actually "created quite a sensation in Leek, where the dairy produce is mainly consumed, and where scarlet fever has recently been largely prevalent." A still more outrageous disregard of sanitary common-sense was spoken of at the water-supply conference the other day. Certain well-to-do people in the neighborhood of Liverpool found their wells going dry, and it became evident that the pumping from one of the corporation wells was the cause. Eventually the owners of the wells were obliged to take water from the corporation, but in order to utilize the wells which were useless for the purpose for which they were dug, they were converted into cesspools, and the liquid house refuse allowed to soak away into them, in spite of the known connection with the well from which the water-supply was pumped!

Dr. E. Janssens, the Chief of the Health Department of the City of Brussels, has made a computation of the mortality from cholera at Toulon, in the epidemics of 1835, 1849, and 1884. In 1835 the deaths were 4.8 per cent. per 1,000 inhabitants; in 1849, 14.0 per 1,000; in 1884, 47.0 per 1,000. This is a severe commentary, certainly, on the cumulative effects of continued insanitary conditions.

#### SAFETY-VALVE.

#### PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

No. VI.

(Continued from page 218.)

FIGURES 15 and 17 are views in two of the bath-rooms in the Marquand house.

Figure 15 represents a plunge-bath on the third story. It is made of Tennessee marble slabs,  $2\frac{1}{2}$  inches thick, rabbeted together at the corners. The sides are let into the bottom and the ends into the sides and bottom, the whole being bound together with brass rods and bars. At the end of the bath which is toward the foreground of the picture, egress from the water is by three steps. The floor of the room and the wainscoting to the height of four feet six inches is also of Tennessee marble of various shades combined for effect. At the right is shown a wash-bowl, the wood-work of which is rosewood, as are the two panel-doors which cover the "chases" above the wainscoting. The panels at the end and front of the wash-bowl stand are hinged in such a manner as to be readily unhung for the purpose of inspection or repairs. The large slab at the head of the plunge-bath, which forms a boxing for the valves and pipes and a concealed overflow, can be taken off by the removal of four screws, giving access for inspection and repairs in this direction.

Figure 16 shows the underside of the same plunge-bath as it appears in a closet immediately under the bath-room. The "chase" seen here with the door ajar is the continuation of that shown at the left in Fig. 15. In it is the soil-pipe *e*, the air-pipe *h*, the hot-water pipe *g*, and the cold-water pipe *f*, and the safe-waste. The trap *b*, the valve-pipe *c*, and the overflow-pipe *a* are the pipes mentioned as being capable of inspection at their upper ends when the slab is removed at the head of the bath. The trap used here is a "bottle-trap," as shown, access to which is through a screw at the bottom. The waste-connection from the bath is also provided with a cleaning-screw at its first bend, as shown, near *f*. The rods *l* are brass binding-bolts, before mentioned, but the bars *k* are iron supports attached to the floor-joists above and simply arranged to take the distributed weight of the bath. This is adjusted by hardwood wedges under the edges of the sides. The panel shown at the left forms a bottom for the hardwood casing when in place and is arranged to be easily removed. The panels of the "chases" throughout the house are lined on this inside with galvanized-iron, and hung similar to a door, with lock and handles to facilitate inspection.

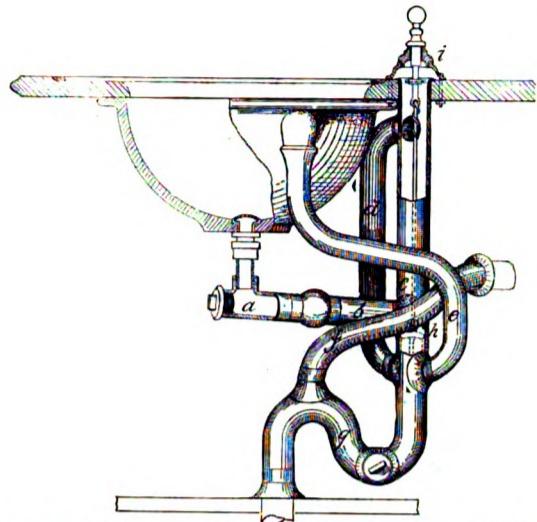


FIGURE 16.—DETAIL OF LEAD-WORK ABOUT BASINS.

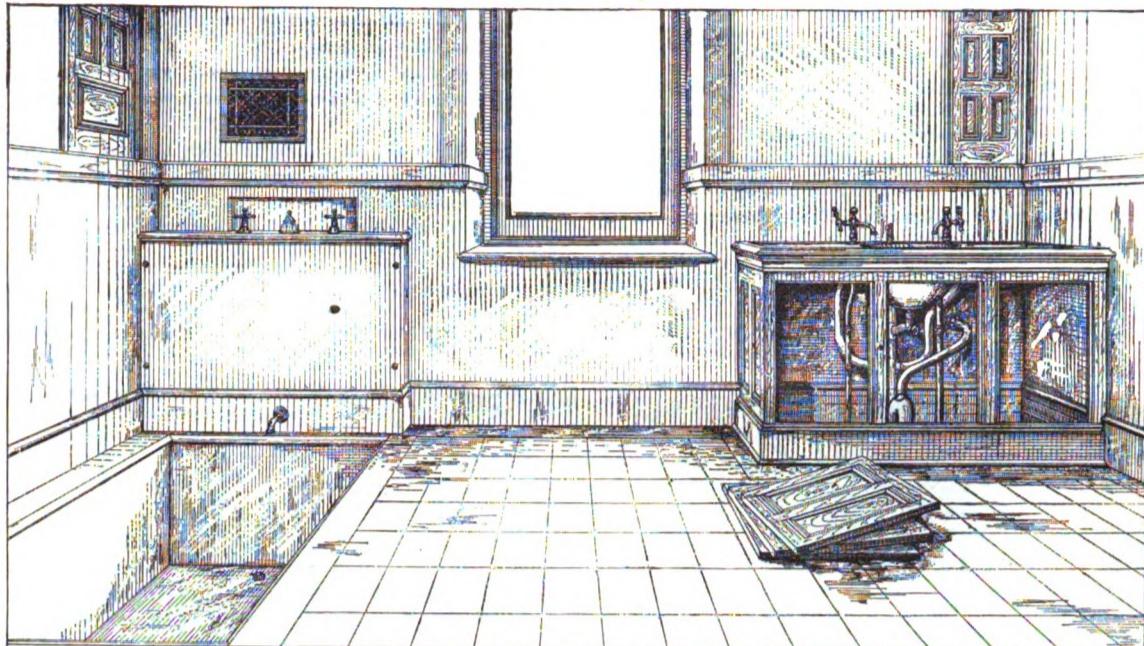


FIGURE 15.—MARBLE PLUNGE-BATH.

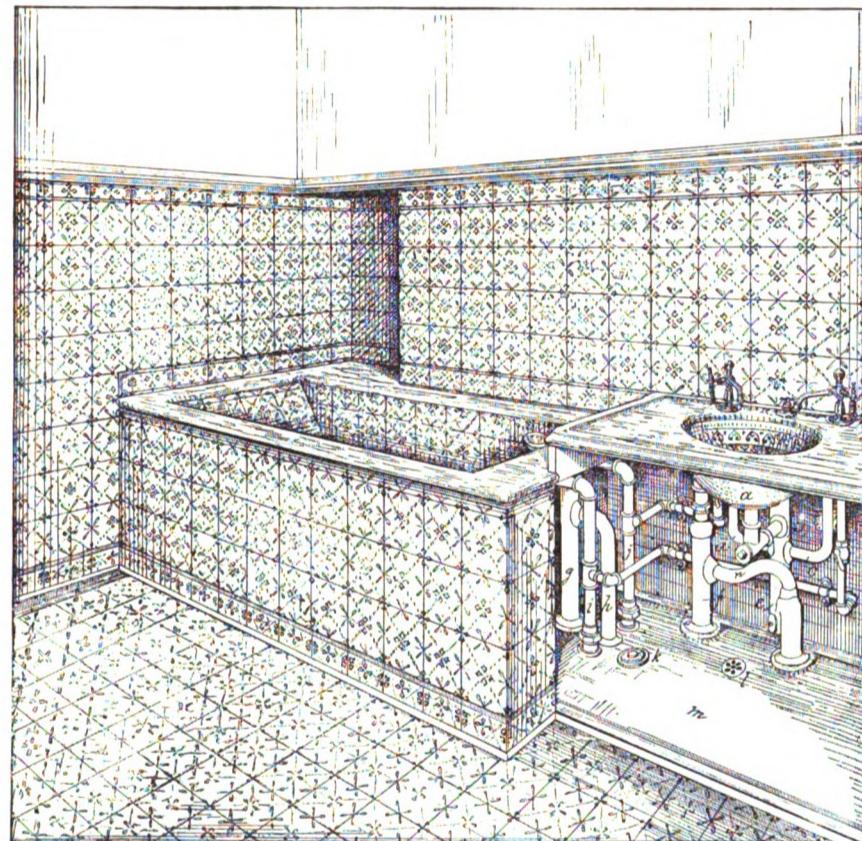


FIGURE 17.—CHINA BATH.

Figure 17 represents a soapstone bath, which is rabbeted and put together with screws, after which it is lined inside and cased outside with tiling similar to the floor and wainscoting, the prevailing color being blue. The detail of the plumbing fixtures are very well brought out in the cut, and need very little explanation from us. The pipe *g* at the end of the tub contains the valve and pull-rod, *h* being the overflow-pipe. At *k* in the marble safe is a 3-inch cleaning-screw, leading to a bottle-trap under the floor, *f* being the back-air pipe from the same trap. The pipes *i* and *j* are respectively cold and hot-water supply.

Figure 18 shows the principle of waste-piping used to basins and baths throughout the house with a single exception, the sketch being a detail of a basin on the third floor. The fitting *a* is made of brass with a cleaning-screw in the "run," the side being tapped to take the "tail-screw" of the basin-coupling. This is pieced out with lead pipe (*b*) to suit the distance to the valve-pipe *c*. In addition to the basin-overflow *e*, is a concealed overflow *d*, which is used to give additional support to the pipe *c*, and give greater capacity or provide another passage should *e* be temporarily stopped. The seat of the valve *h*, which must be

in the pipes *c* between the junctions of the pipes *b* and *c*, is inserted into the pipe, which is cut for the purpose, the ends being reunited again by "burning." To withdraw the valve *h*, the nut *i* may be unscrewed, when the whole can be lifted out.

(TO BE CONTINUED.)

#### THE GERM THEORY.

THE advocates of the germ theory hold that those diseases which are known as zymotic are the result within the body of minute organisms which bear a resemblance to those which produce fermentation. In the case of two of the zymotic diseases—viz., cholera and enteric fever, and these are the most destructive of the entire class—it has been proved beyond doubt that water contaminated with sewage which has been infected by patients suffering from these diseases is capable of producing the same class of disease among those who drink the infected water. This is now so thoroughly recognized that the dread of epidemics is to some extent lessened by sanitary precautions; and a great deal more good would be done by introducing a pure water-supply. The one great question which will

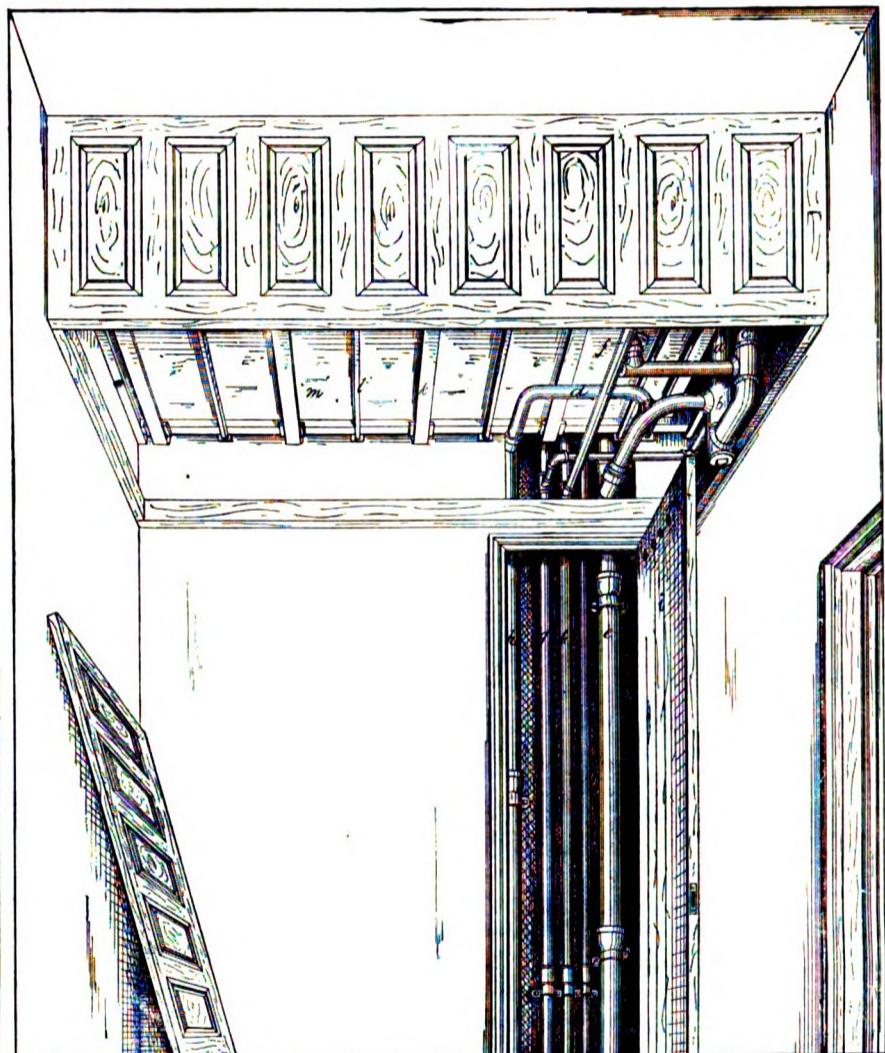


FIGURE 16.—PIPING UNDER PLUNGE-BATH.

for the future engross the public mind, is how infectious disease is spread. On this subject we can only remark that we must first of all look to our surroundings at home; next to what we eat and drink, and we must carefully distinguish between fancy and reality; in a word, we must go to the feeding-ground of our supplies, and find out if the source is good and healthy, and then trace it to its destination. It may be well to go a little further and examine your homes, the method of cooking, and the water-supply, as well as the place in which the supply was kept before using. These remarks especially apply to one commodity—milk; for, if originally pure, it may be made infectious and the direct medium for the propagation of disease. This infection may be acquired by means of adulterations, or dirty vessels, or by being kept in a polluted atmosphere, or in places where infection can be acquired.—Dr. T. B. Moriarty's Address at Cork Hospital.

THE Jacksonville, Fla., Board of Health has chosen the following officers: President, Dr. C. Drew; Vice-President, Dr. Hy. Robinson; Secretary, Dr. A. W. Knight.

PLUMBING AND WATER-SUPPLY IN  
THE RESIDENCE OF MR. HENRY  
G. MARQUAND.

No. VII.

(Continued from page 241.)

THE illustrations, Figs. 19 and 20, are views at opposite ends of a bath-room forming one of a suite on the second story.

To the right as you enter through the curtained doorway is the wash-bowl, a sitz-bath, and a foot-bath. The handles which operate the sitz-bath are on the end of the basin-slab, as shown. The water is admitted near the bottom through a single aperture, the hot and cold-water pipes being brought together after passing their respective cocks. The waste-valve and pull-rod are in the pipe *a*; *b* being the concealed overflow. The waste-pipe at the lower end of the pipe *a*, below the valve, runs to a bottle-trap below the floor, the cleaning-screw of which comes through the marble safe of the basin. The "back-air" pipe from the bottle-trap is shown coming through the safe and entering the wall above the bottom of the basin. Under the basin is an S-trap, shown by dotted lines, the "back-air" pipe of which joins the air-pipe from the bottle-trap. The square bath *B* is a foot-bath partly portable. When pushed in the door of the basin-stand can be closed, and no appearance of the foot-bath remains. A depression in the safe which protects the basin and sitz-bath is made immediately under the foot-bath. This depression is furnished with a bottle-trap, "back-aired" similar to the sitz-bath, the cleaning-screw of which is in the depression and not seen. A short waste-pipe from the bottom of the foot-bath extends into the depression completing the waste-connection from the foot-bath. The hot and cold-water faucets for the foot-bath are to be attached to the *tees* shown at the corners of the pipes leading to the basin-faucets, but which are not as yet applied. The straight pipes shown, rising under the basin-slab from the hot and cold-water pipe, are air chambers.

Figure 20 shows a bath-tub at the opposite end of the same room. The tub is heavy white porcelain, and is supported on adjustable brass legs (*c*), which rest on the marble safe. The pull of the valve in this case is at the corner of the tub, instead of occupying the usual position between the two faucets. The pipe *a* is the valve-pipe, and *c* the waste, *f* being the back-air pipe, and *d* the neck of a bottle-trap, with cleaning-screw. The overflow-pipe *b* does not enter the pipe *a*, but runs to the dip of the traps, as shown by the dotted lines.

The floor of the bath-room is of Tennessee marble of rather dark colors. The base is of the same marble of lighter shades, and the wainscoting is of colored glazed-tiles, the prevailing color being canary. The ceiling and walls are oil-painted.

(To BE CONTINUED.)

A NEW METHOD OF TREATING LIME-WATERS.

IN some German factories, especially in dyeing establishments, a new process is employed in order to soften water which holds lime in solution. The process rests on the fact that magnesium-oxide, brought to red heat, easily absorbs—after hydration—the free carbonic-acid held in solution by natural waters. This brings about the precipitation of the calcium-carbonates which were held dissolved by the excess of carbonic-acid. The magnesia itself is then dissolved, and combines with the bicarbonate of magnesia in the water to form the carbonate.

The purification of the water, is moreover, according to Prof. Strohmann, of Leipzig, based on the decomposition of gypsum or sulphate of lime, which is associated with the carbonates in natural waters; for when there is no gypsum the hydrate of magnesium has no effect on the bicarbonate of magnesium, and no simple carbonate is formed. The water thus purified did not seem, at first, suitable for boiler-feeding; it was said that it attacked the old generators and filled them with mud. However, it was found later that the sulphate of magnesium dissolved in these waters raised to a high temperature reacted on the carbonate of lime, of which the boiler deposits are formed, and gradually formed sulphate of lime and of magnesia, thus changing into slime the deposit formerly adherent.—*Revue Industrielle*.

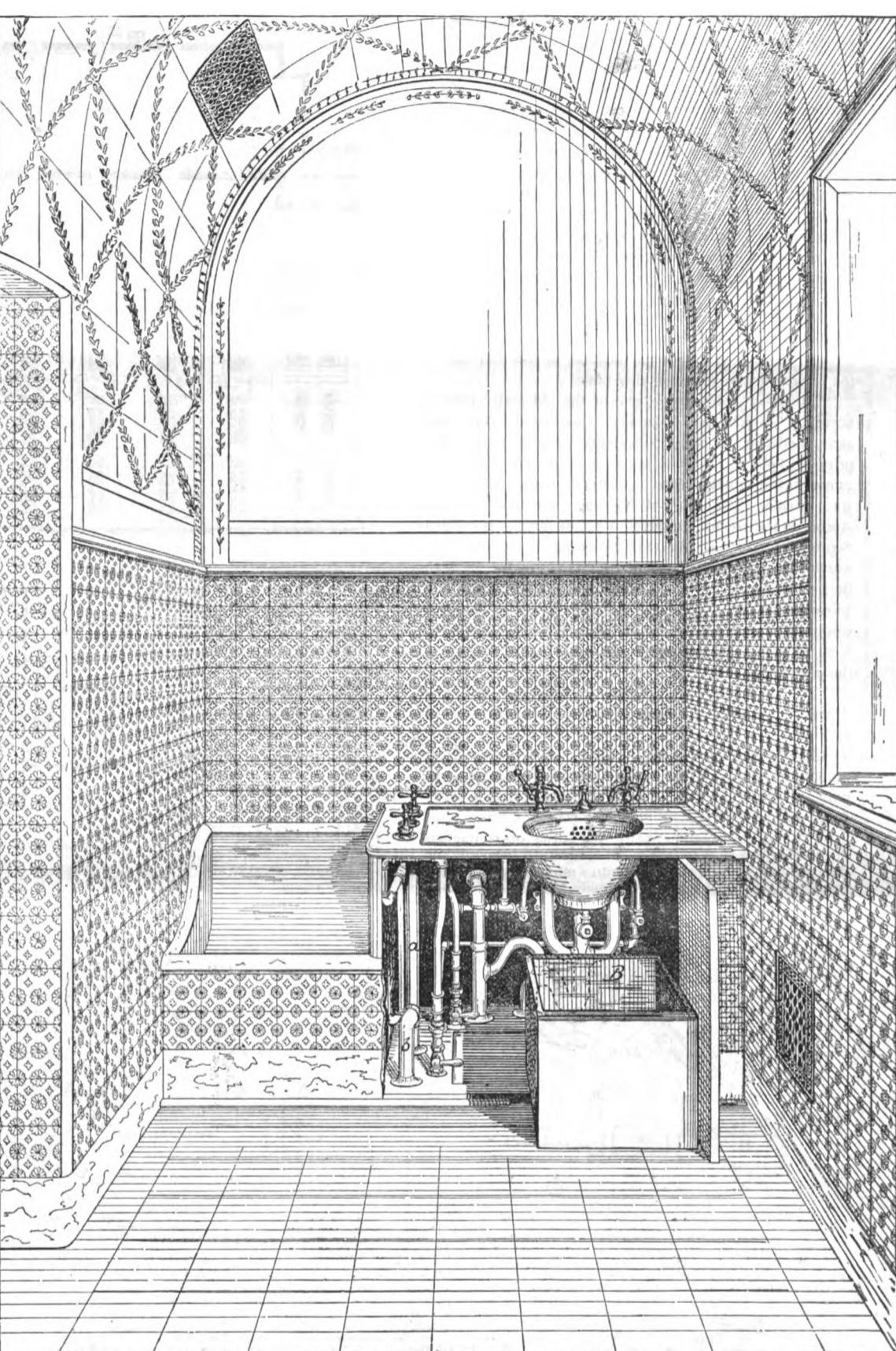


FIGURE 19.—VIEW IN BATH-ROOM—RESIDENCE OF MR. HENRY G. MARQUAND.

THE STATISTICAL WORKS OF DR. FARR.

*The Sanitary Record* says: "It has long been the source of much regret among students of vital statistics, as well as among those practically interested in this branch of sanitary science, that the valuable statistical work of the late Dr. Farr is, from the form and manner of its publication, not generally available. The Sanitary Institute of Great Britain proposes, in these circumstances, to publish a selection from Dr. Farr's official reports, papers, and addresses, and has confided the selection and editing of this memorial of his labors to the capable hands of Mr. Noel A. Humphreys, of the Registrar-General's Office. It is proposed that the volume should consist of not less than 450 pages, 8vo., and that it be published at the price of 30s., or, to subscribers, one guinea, provided that the number of subscribers warrants the Institute in incurring the expense of publication. Intending subscribers are requested, therefore, to send in their names without delay to the Secretary of the Institute, in order that this council may be able to determine whether it will obtain sufficient support to justify it in publishing the book."

DR. LYMAN C. DARWIN, of Syracuse, reports that the health of that city during June has been excellent, with a death-rate a little lower than for the same month of 1883. There has been gratifying absence of any thing resembling an epidemic, and of any general disease.

IN the month of June the inspectors of the New Orleans Auxiliary Sanitary Association inspected 6,333 premises, housing 26,095 white, and 4,598 colored inhabitants, and found the following conditions: Lot-filling bad, 100; drainage defective, 63; crowded, 12; filthy yards, 108; privies good, 3,408; full or foul, 1,831; defective, 186; without flues, 1,602.

Water-supply—Hydrants, 840; cisterns and hydrants, 830; cisterns only, 4,461; no water-supply, 202; premises with wells, 325.

THE \$150,000 required for the completion of the Technical College at South Kensington, London, has been guaranteed, and the institution will be fitted up before the end of autumn.

## SEWAGE DISPOSAL.

SEWAGE SYSTEMS AND THE EPURATION OF SEWAGE BY IRRIGATION AND AGRICULTURE. By Henry J. Barnes, M. D. A paper read before the Suffolk (Mass.) District Medical Society, April 30, 1884, with discussion on the same, April 30 and May 21, 1884. Boston *Medical and Surgical Journal*, June 10 and 26, and July 24, 1884.

Why the author of this paper should speak of "systems of sewage" when he meant sewerage, and why he should transfer into English the French words *épuration* and *filtrage*, instead of translating them, are questions which puzzle the reader at the outset. There is traceable through the paper a certain affectation in using transferred French terms and idioms, which is annoying, to say the least, and produces an impression on the reader's mind that the writer was not thoroughly familiar with either language.

The arrangement of the facts stated is not very systematic, and consequently it is not easy to draw from the mass of interesting statistical matter given any clear idea of the progress and present condition of the efforts at purification of sewage by various methods. It is clear, however, that by irrigation of the soil and downward filtration results have so far been attained more satisfactory than those reached by direct treatment of the sewage by chemicals.

It is therefore urged that efforts should be made by the suburban towns near Boston to purify their sewage on land, rather than to attempt to convey it all to Boston Harbor, where it will probably create a nuisance in the future.

In the discussion which followed the reading of Dr. Barnes' paper, Mr. E. W. Bowditch, C. E., stated that he understood that Pullman, Ill., had abandoned irrigation and was discharging its sewage into Lake Michigan, but Mr. Elliot C. Clarke denied that this was the case, and Dr. Barnes produced a letter from Mr. E. T. Martin, the superintendent of the Pullman sewage-farm, in which he stated that the sewage is thoroughly purified on the land and creates no nuisance, and that the farm last year paid six per cent. on the money invested in it.

Dr. Faxon stated that some of the sewage of Boston, which is conveyed to Moon Island in the harbor by the new "improved sewerage works," came to shore in Quincy Bay, was "already creating a nuisance along the beach," but this was distinctly denied by Mr. Clarke, the engineer in charge of the works, who said that none of the sewage discharged ever turned into Quincy Bay.

Mr. E. S. Philbrick, C. E., questioned the practicability of obtaining in Massachusetts sufficient ground of a suitable character for sewage purification. Referring to the treatment of the Paris sewage at Gennevilliers, he said: "The success of these farms, as I am informed, is attributable to the fact that the delivery of sewage to the farmer is at his option, and not obligatory. Such a system can never be a reliable source of relief to a town so long as any considerable portion of the sewage flow is liable to be left undispersed on a wet day."

Mr. Philbrick said that "irrigation puddles the surface, which, unless very sandy, cakes and hardens when drying, requiring frequent hoeing to pulverize the soil." To this Dr. Barnes opposed the counter-statement, that "the soil does not clog where systematic irrigation is practiced. The thin skin of impervious deposit when dried shrinks, cracks, and breaks up, the organic matter decays, and the soil is more pervious than where irrigation is not employed." Neither of these gentlemen gave his authority for these diametrically opposite assertions.

Dr. Barnes states in his paper that "if the surface irrigated is under cultivation the fertilizing matter is immediately utilized; if not, it accumulates without loss and transforms the poorest soil into land of extreme fertility." This opinion does not agree with the statements of Professor Robinson on page 23 of his "Sewage Disposal," as follows: "However well land may act as a purifier of sewage for sanitary purposes, it can only be relied on to utilize the manurial constituents of the sewage, according to the requirements of the crops for the time being assimilating them, and any excess of the supply of manure over the demand by the crops is not stored up for subsequent use, but is wasted, and passes off in the subsoil drainage either partially or wholly purified, according to the nature of the land and of its preparation to filter and oxidize the sewage passed through it. Land is not made more fertile by filtering the sewage of a thousand people through an acre than it is if the sewage of a hundred only is applied."

As calling public attention to the necessity of preparing for what is inevitable, some method of safe disposal of the sewage of communities, such papers as this of Dr. Barnes and the discussion upon them are of great value. Crude

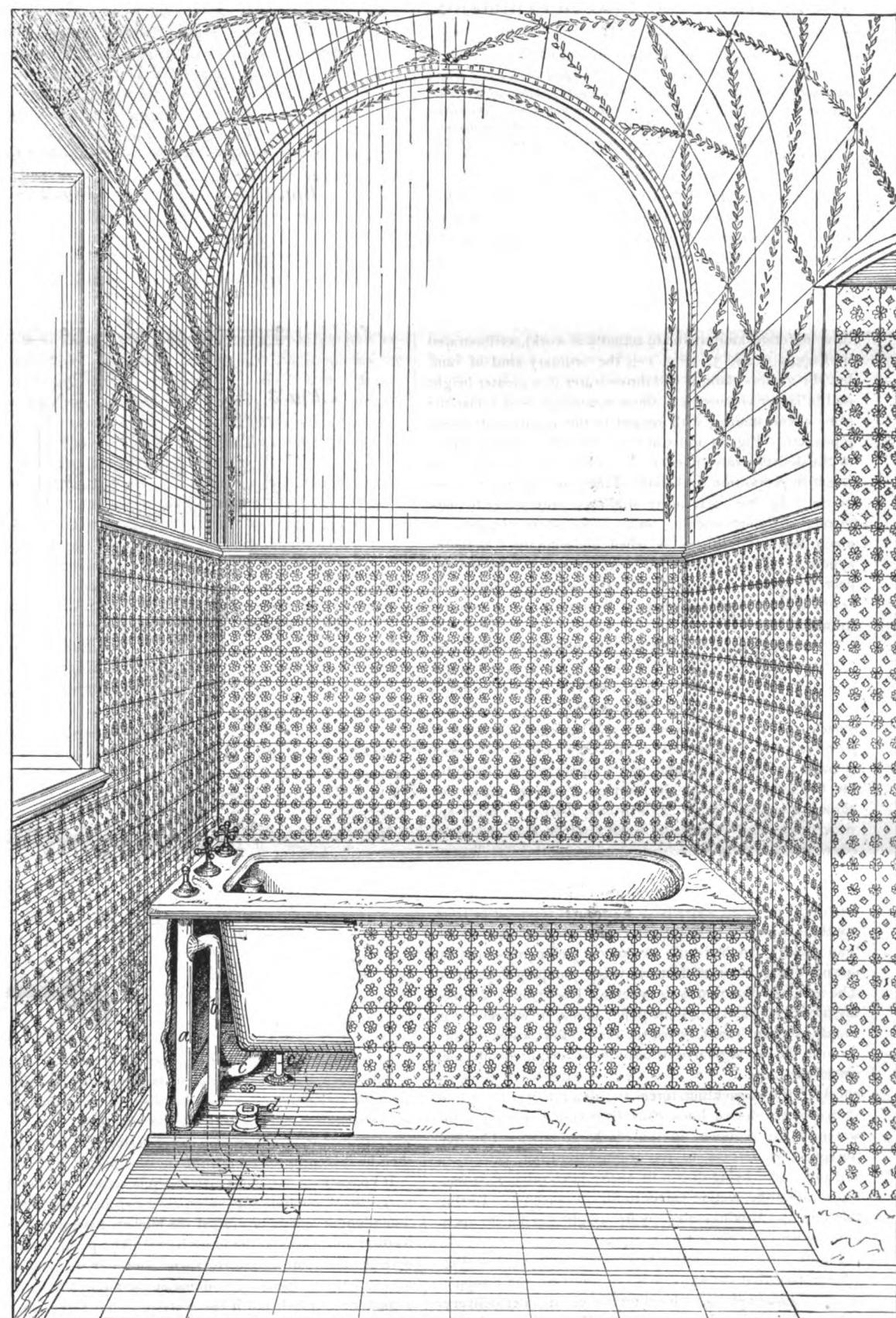


FIGURE 20.—VIEW IN BATH-ROOM—RESIDENCE OF MR. HENRY G. MARQUAND.

theories are apt to be set forth and a good deal of irrelevant matter brought in, but in the absence of actual experience in this country that is only to be expected at present. The great point is to arouse public interest on the subject to such an extent as to prevent the occurrence of such circumstances as happened lately in a growing village suburban to New York. A plan of sewerage was prepared by an engineer, which provided for the discharge of the sewage into a stream flowing through a district certain to be thickly populated at an early day. Some opposition being aroused, the village trustees called on two other engineers for reports on the plan. One of these reports approved the scheme, and was published. The other one objected to the scheme of disposal, and was suppressed, and never laid before the board or the public.

**PREPARATIONS AGAINST CHOLERA.**—More, far more, can be accomplished now, in the way of safety and protection, than when the disease is upon us. Instant and energetic action should be taken toward cleansing the city. The finding and removal of all filth heaps, whether conspicuous or hidden in back yards or cellars; the ventilation and drainage of dwellings, and especially the prevention of overcrowding and consequent house-air poisoning, and the closure or removal of all buildings which are dangerous to life and health. The inspection force should be doubled or trebled, and their reports of dangerous places acted upon promptly. The people should be awakened to the threatened danger, and every effort should be made to fortify our city as speedily as possible to resist the approaching foe.—DR. LINDSLAY, *Health Officer of New Haven, Conn.*

THE State Board of Health reports to Governor Cleveland that the nuisance at the Glen Cove Starch Works still exists, and should be abated.

THE Inspectors of the New York Building Department have pronounced the District Court Building, No. 154 Clinton Street, unsafe on account of overhanging coping.

PLUMBING AND WATER-SUPPLY IN  
THE RESIDENCE OF MR. HENRY  
G. MARQUAND.

No. VIII.

(Continued from page 265.)

FIGURE 21 is a view in the servants' wash-room on the basement floor. In this room is the wash-basin shown, an enameled bath-tub, and a porcelain water-closet. Underneath the water-closet is a marble safe with waste, the mosaic floor having a slight inclination to the safe. The water-closet fixtures are all exposed to view, and are simple and neat, similar to that under the basin, to admit of thorough washing out; a portable seat of rosewood with cast-brass lugs resting on the corners of the safe completing the finish. The mosaics of the floor are laid in hydraulic cement, and the sides of the room are wainscoted for half their height with white porcelain tiles. All the exposed water-pipes in this room are seamless brass, tinned, with nickel-plated fittings and cocks, the waste and other pipes being heavy lead.

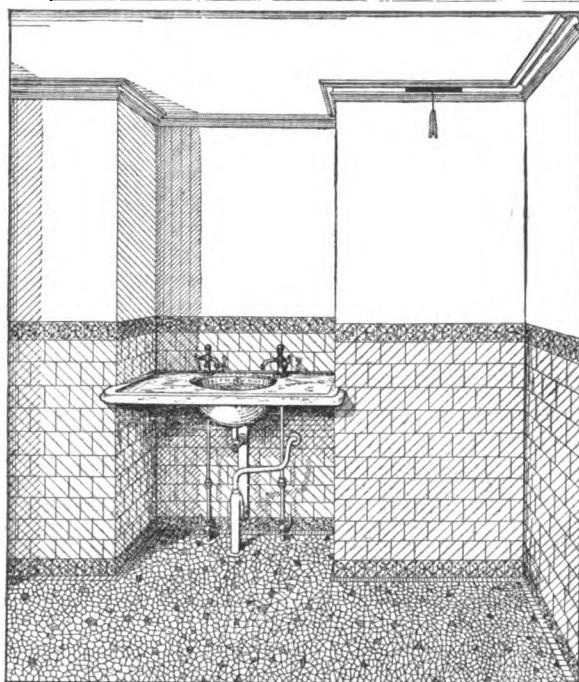


FIGURE 21.

Figure 22 is a view in the cellar where the "safe-wastes" are brought together over a sink. The pipes *f* are the safe-waste pipes from the principal divisions of the house. At their ends over the sink they are furnished with "swing" check-valves to prevent a current of air from the cellar passing up them. The sink is galvanized, and is let into the wall at the end and back, and leaded so as to dispense with a leg at the outer corner. The arrangement of the trap and vent (*b*) are shown, as well as the main water-pipe (*C*), with its branch (*d*), and part of the house-drain, *d*.

Figure 23 is a view in the tank-room. The pipe *C* is the tank-supply, two inches in diameter, and is connected with the caloric engine and with a steam-pump in the cellar. The pipe *a* is the main water-supply from the tank, and is two inches in diameter. It is connected with the tank at the side, and is also carried above the tank for a vent, etc. The pipe *f* is the overflow. It runs to the roof, and is carried up within the tank, as shown by the dotted lines. The pipes *b* and *d* are air and expansion-pipes from the tank and Croton boilers respectively. The pipe *g* is the "draw-off" pipe, and runs to the nearest line of soil-pipe, while the pipe *h* is the safe-waste, and runs to the sink in the cellar (Fig. 22). The pipe *c* is the "tell-tale" pipe, and is three-quarters of an inch in diameter. The tank is made of  $\frac{1}{4}$ -inch iron, riveted and chipped and calked. It is six feet high and six feet in diameter, with a band at the top edge and a flanged bottom. The tank-safe is of  $\frac{1}{4}$ -inch iron, six inches larger in diameter than the tank, and three inches deep. The edge or side is formed by a flange turned on the bottom, and is in one piece. The whole is heavily painted in white.

(THE END.)

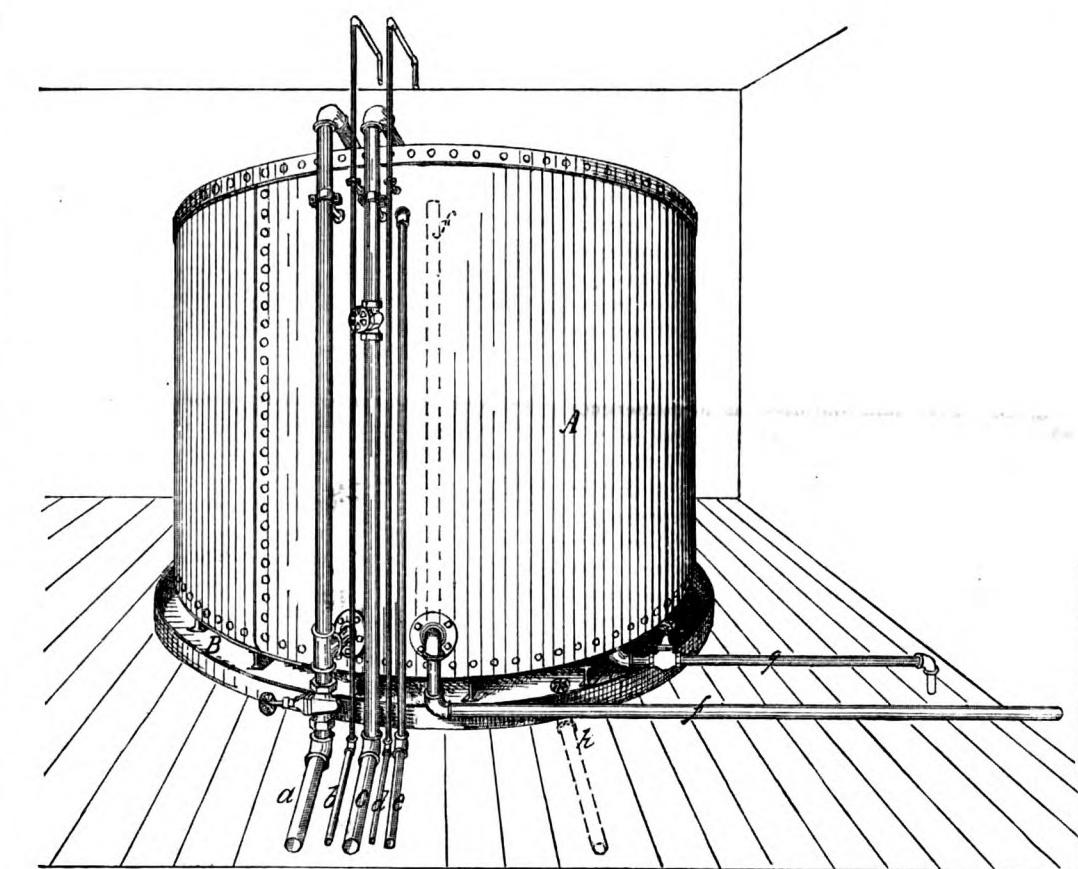


FIGURE 23.

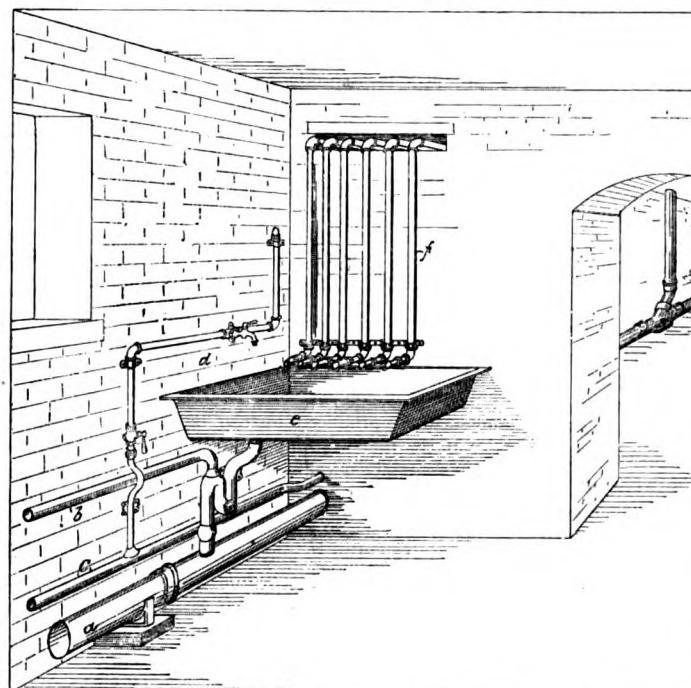


FIGURE 22.

WORK OF THE PARIS MUNICIPAL LABORATORY.

THE following is a list of the principal food articles analyzed in the Municipal Laboratory of Paris during the month of June:

	Total No. Examined.	No. Re- ported as good.
Wines.....	552	113
Vinegars.....	14	6
Beers.....	21	16
Ciders.....	17	7
Alcohols and Liquors.....	16	6
Waters.....	19	6
Milks.....	433	327
Butters.....	13	11
Oils.....	8	5
Flours.....	6	5
Meats.....	2	0
Peppers.....	5	1
Coffees, Teas, etc.....	7	6
Chocolates.....	14	7

THE Chief of Police of Philadelphia has issued an order to the police, ordering them to report the various gutters and streets which require flushing, and the lieutenants of the districts are ordered to see that the work is done every night between the hours of 10 P. M. and daylight, so far as practicable.

HERE is a friendly word for the cesspool and leaky drain in connection with water-supply. We take the extract from the annual address of Mr. H. C. Bartlett, Ph. D., F. C. S., delivered before the Sanitary Institute:

"In describing a case of great hardship in the attempt to prove that a suburban well was contaminated with sewage, I was much struck with the evidence of an analyst whose reports on the London water-supply are often quoted. He stated with emphasis 'that the presence of normal healthy sewage in drinking-water is not injurious to health, its only effect being to cause those who drink it to become fat'—certainly one of the nastiest aspects of practical sanitation."

The analyst in question might have gone a step further and defined the normal healthy state of sewage, so that we might know where it is absolutely necessary to draw a line.